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Published monthly, except June-July and August-September, when published bi-monthly at Waterloo, Wis., by the Farmer's Digest Company

25c a Copy 1 Year $2.50
2 Years, $4.50 3 Years, $6.50
Canadian and Foreign Subscriptions, $3 for 1 Year, $5.50 for 2 Years $8 for 3 Years

POSTMASTER: Return all undeliverable copies to Farmer's Digest, Fort Atkinson, Wis. Entered as second-class matter at the Post Office at Ambler, Pa., July 30, 1948, re-entered at Fort Atkinson, Wis., additional entry at Waterloo, Wis., under the act of March 3, 1879.

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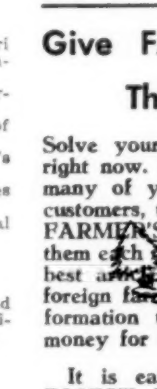

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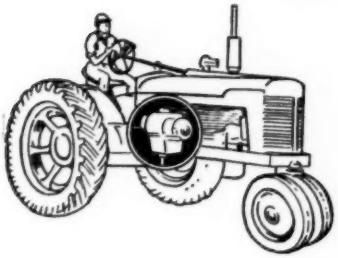
Artificial Insemination of Dairy Cattle
The Needle is Not Enough—

The Farmers Digest

Volume 18 December 1954 Number 6

New Kind of Tractor Power

International's new tractor and generator forecast the day when you will power your combine with electricity . . .



Condensed from Breeder's Gazette

Bailey Guard

EVER wonder why farm implements shouldn't be as neatly designed and smoothly efficient as industrial equipment? Sure, bulky crops and widely varying field conditions pose special problems— and the new combines, one-man balers and mounted pickers are wonderful improvements. Still, many powered implements contain enough belts, chains, pulleys, gear-boxes, torque-tubes, joints, push-rods and ratchets to turn Rube Goldberg green with envy.

Convenient, flexible, easily-maintained electric power is one big difference. Now, International Harvester in a progress report covering 5 years of research in cooperation with General Electric, announces a development which may take its place as a new milestone in power farming progress, comparable quite possibly, to putting rubber tires on tractors or replacing threshing machines with combines. At least, that is the challenge posed by the prospect of

Reprinted by permission from Breeder's Gazette, Spencer, Indiana, August, 1954

electrifying many field tools.

The IH "Electrall," soon to be in production, consists of a powerful but compact generator mounted on the side of their large farm tractor and driven by the tractor engine. This generator develops 220-volt 3-phase 60-cycle a.c., 220-volt heavy load single-phase a.c., and 120-volt household current. Thus it can power trailing or tractor-mounted implements; hay-driers, barn-cleaners, silo-unloaders, pumps, chain saws, milkers, or feed mills; run portable hand tools and provide lighting off the power line, or serve as a stand-by generator.

Such a mobile electric supply can be handy and useful right now. In addition, a number of intriguing possibilities are open for research, such as electric weed control, electrocuting corn borer moths attracted to an ultraviolet tractor light while you work the field at night, and fooling plants into early flowering by using lights to change the length of "day" slightly—to say nothing of giving you ultrasonics or X-rays if you want 'em.

It is too early yet to tell what the impact of electric power on farm implement design may be, but here are some of the possibilities: The newest electric motors are more compact and less cumbersome. Both the generator and motors designed by GE for this job are about half the usual size. For example, the "Electrall" generator weighs 300 lbs. It will drive a 7½ h.p. single-phase motor for pumps or haydriers, a 3 h.p. 3-phase motor that is difficult to start, or a 10 h.p. 3-phase motor whose starting duty is light.

The 10-horse motor demonstrated weighs only 130 lbs. and has a surprising 200% overload capacity (15 min.). The Hinsdale farm demonstration proved that's enough power to do a mighty smooth job on a baler even, replacing a 600 lb. 18 h.p. water-cooled or a 300 lb. 24 h.p. air-cooled engine. This light weight makes it quite practical to move the motor from one implement or job to another.

Maintenance and repair trouble and costs should drop way down with electric motors. Also, because gas engines are seldom kept in the "pink," they are often furnished larger than otherwise necessary; but electric motors consistently deliver full power.

Safety and ease of control will be a major advantage. There would be no temptation to leave the machine running, and safety shut-off switches can be easily installed. 220 volts won't permit downright abuse, but cable connections can be far safer than unguarded drive shafts.

Electric operation would be steady, clean, quiet and efficient. The GE motor used on the ex-

perimental baler handles shock loads well, and lugs through intermittent overloads that would put a gas engine out like a light.

In powered implement design, electricity can give the engineers new latitude and flexibility. Small motors can be spotted at strategic points in the baler or combine where the action is needed, instead of depending on awkward power trains. Motors of constant torque, h.p. or speed can be selected to do each job best, independently of the main drive. The generator-motor combination may provide more efficient use of power by avoiding the frictional, directional and gear losses of mechanical linkages.

Right now, electrified field machinery is only a highly promising prospect, and there are still plenty of design, production and merchandising problems to be solved. But adding electric power to the tractor's mechanical power looks to us like a welcome step forward which some day may make present implements seem as obsolete as the 1890 shop.

► ◄

USDA 1954 Yearbook Tells of Marketing

"Marketing" is the title of the 1954 yearbook of agriculture. It contains facts about the complex system that brings American farm products to their users.

The 520-page volume covers marketing from the farmer-salesman to selling in foreign markets. Chapters include transportation, storage, packaging, grades and standards, prices and pricing, and launching a new product.

Alfred Stefferud, editor of the Yearbook, says, "The purpose of this book is to give information about the dynamic business that brings American farm products to their users.

"The information should help the farmer to make more money; the housewife to buy better; the wholesaler, retailer, and all others who handle farm products to give better service; and the administrator and student of agriculture to get a broader view of the structure of this large sector of our economy within which so many agricultural problems come to focus."

A Congressional document, the yearbook is distributed mainly by members of Congress. Individuals may request one from their congressman or buy one from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The Department of Agriculture does not have copies for distribution.

University of Wyoming

15 Good Cows Beat 91 Average Milkers

A recent Missouri survey shows the value of high-producing cows in the dairy herd . . .

Condensed from Missouri Ruralist

ONE OF the biggest problems in setting up a "Balanced Livestock Plan" for many farms is to get a sufficiently large volume of production. To have a satisfactory income, one must have a volume of products to sell.

Dairying is the most common solution to this problem in Missouri. With dairy cattle, farm families can market labor as well as growing crops, grass or grain.

Thus, dairying plays a vital role in Missouri's Balanced Farming Program sponsored by the Missouri Agricultural Extension Service.

But mere milking of cows does not insure profits. It's when the principles of Balanced Farming are applied to dairying that the biggest returns are realized. A Balanced Livestock Plan really pays off in dairying.

Here are some striking figures: Detailed reports from 5 farms with Balanced Farming programs in full operation are available from records of the DHIA state contest for efficient milk production.

The 5 top dairymen in this contest realized a labor income of $204 for each cow. But the average dairy cow in Missouri last year returned only $33 for labor.

At this rate, 91 average Missouri cows would be needed in a herd to return an income of $3,000. But with the management of the 5 top dairymen only a 15-cow herd would be needed to return $3,000.

Much of the contrast was due to milk production per cow. The average Missouri cow last year produced 4,249 pounds of milk; cows owned by the 5 top dairymen averaged 10,139 pounds. In fact, the winner of the contest, V. W. Wallace, Shelbina, had a production of 12,607 pounds.

One striking feature of results

Reprinted by permission from Missouri Ruralist, Topeka, Kansas

in this contest is that all 5 herds were practically the same size. Largest herd was 25 cows, smallest 23 cows. This gives a clue that the most efficient size herd in Missouri is about 25 cows—a 1-man operation with modern equipment.

In fact, dairy specialists, believe 15 to 30 cows for every man fully employed is the right number in Missouri.

Recently, records of all DHIA reports in the state for April were analyzed to see whether there is any money in dairying. Some 39 associations reported.

High and low herds in each association were used to figure returns from the average cow in the high herds and the low herds. Costs other than for feed were estimated by the old accepted "rule of thumb"—that these costs represent one half the feed costs.

High herds averaged 23.6 cows, produced 1,090 pounds of milk during the month worth $48. Feed costs averaged $16.70 a cow; other costs thus averaged $8.40 to give a labor return of $22.90 a cow.

Low herds averaged 21.9 cows, produced 507 pounds of milk during the month worth only $22. Feed costs were $11.20 and other costs were estimated at $5.60. This gave $5.20 labor return.

To have a monthly income of $250 would require 11 cows in the top group, 48 cows in the bottom group.

High producing herds returned 4.4 times as much for labor as low herds.

And remember that even low herds in DHIA reports are better than average Missouri cows.

These figures emphasize the importance of good management, of a Balanced Livestock Plan for dairying.

These figures emphasize there are two important "musts" for dairying: to have as many cows as can be efficiently managed on your farm, and to have cows that produce as much as possible.

Normally, from 4 to 8 acres are needed for every cow. You should be able to produce from 1,500 to 2,000 pounds of 4 per cent milk to the acre.

Here's a program suggested by the Missouri Agricultural Extension Service to insure progress toward more efficient cows:

(1) Start with best cows available.

(2) Breed own replacements using best sires available. Artificial breeding is best for most dairy farms.

(3) Constant selection of best animals for replacements and constant culling of inferior animals from the herd based on records of production, health, and breeding and on observa-

tion of dependable and satisfactory lifetime performance.

(4) Improvement in feeding and management of the herd to fully exploit their productive ability and prevent losses from disease.

(5) Carefully raise calves and grow out heifers to provide healthy replacements of good size and quality.

(6) Records of production and breeding records must be kept to develop good herd in the shortest possible time.

Pasture needs must be met first. Production costs in dairying are lowest when good pasture is available. At least 240 days of grazing should be had in Missouri, from mid-March to mid-November. Small grains, drouth-resistant crops like Sudan grass, improved permanent pastures, meadow crops and mixtures all can be utilized. And surplus grass can be preserved in a silo.

Winter roughage is the next consideration after pasture. For dairy cows winter roughage must be of high quality and at the same time be cheap to produce. More of a variety of high-grade hays and silages should be fed, reducing needs for protein supplement and less total grain. An average cow will require from 2½ to 3 tons of hay or hay equivalent for a 180-day feeding period. Both row crop and grass silage have a place in dairying. Dairymen should have both legume and non-legume hay.

Look, Before You Jump Into Molasses

Molasses is a good feed buy right now, but it would be wise to look at its price history before investing much money in facilities for its use, says N. N. Allen, Wisconsin dairy specialist. He says the price of molasses in relation to other feeds is different from year to year—and in some years molasses has been a very high cost feed.

Molasses is primarily a source of energy. Allen says it is a very poor source of protein, and is low in the phosphorus and vitamins a cow needs. Cows do like it, though, and will readily eat feeds mixed with molasses even when these feeds would be unpalatable by themselves. When mixed with ground feeds, molasses helps cut down on dust. What's more, it smells good—both to the farmer and to his cows.

When is molasses a good buy? Allen says a farmer cannot afford to pay more than two-thirds as much per pound for molasses as for corn. Or, it takes about 6½ gallons of molasses to equal the energy value of one bushel of corn.

Wisconsin Extension

VETERINARIAN'S NOTEBOOK NO. 10

"Little and Often" When Feeding Calves

Our English veterinarian puts calf care in plain English . . .

Condensed from Farmer and Stock-Breeder

"IF you haven't disinfected this box pen as I suggested after the other batch had the scours, what do you expect? It's not a bit of good putting clean calves in dirty boxes. How often are they being fed? Three times a day and these only 4 days old! I told you all about the importance of the first milk the last time and I remember I suggested then that you would get better results if you fed five or six small feeds a day for a few days. Oh! well, this will be a lesson to you all right."

I was taking Arthur to task about his calves. He had one outbreak a month ago and now he'd got another due entirely to his own fault.

Calf scours are a serious thing and are responsible for the death of hundreds of calves every year. The "true" calf scour or white scour usually appears soon after birth.

The calf goes off its milk, stands about with its head and tail down, its eyes dull. The faeces are greyish white in colour, foul smelling, becoming watery and soon the rear end of the little creature becomes "scalded" and sore.

Teeth Grinding

Now and again it will grunt and grind its teeth. It's coat becomes "staring," it lies down, becomes comatose and dies in a few days. In very young calves, death can occur in about 12 hours.

What are the causes of this

Reprinted by permission from Farmer and Stock-Breeder, London, England

serious disease? They can be divided in two headings—the exciting cause and the predisposing cause.

The real or exciting cause of calf scour is a germ known as bacillus coli which is a normal inhabitant of the bowels of both calves and adult animals. Yes, believe it or not the germ is always present in the healthy animal but it only multiplies rapidly and causes disease when conditions arise which lower the resistance of the calf. It is this lowering of resistance which comes under the heading of predisposing causes.

First and foremost the failure to feed the colostrum or first milk to the calf is the important feature. Colostrum has not only an important laxative quality but it is rich in protein and vitamins and perhaps most important of all, it is rich in "anti-bodies" against the numerous common germs including bacillus coli which surround the calf immediately it is born.

Colostrum can vary in value according to the condition of the cow and the nature of the food she has received during pregnancy.

Next there is the method of feeding the calf from the pail. Remember that a calf allowed to suckle the cow feeds itself a "little and often"—its tiny stomach cannot cope with large feeds and therefore it is no good offering a newly born calf two meals a day from a pail. It will tend to gulp down large quantities from sheer hunger. This will upset its stomach and you have paved the way for bacillus coli to get busy!

I know its difficult to find time, but you'll find it will pay to feed a "little and often" for the first week or two. Do not overload the stomach.

While we are on the question of milk feeding, what about the temperature? It's got to be just right. There is only one proper temperature at which milk should be fed to calves and that is body temperature. If you feed it too hot or too cold you are likely to cause acute indigestion and bacillus coli will love that!

Dilute the Milk

If the calves show a tendency to diarrhea, dilute the milk with warm water or lime water. This applies especially to Jersey and Guernsey milk with its high fat content.

A too rapid change over from whole milk to milk substitute is another predisposing cause of scour. Remember that clean fresh whole milk is the natural food of the new-born calf. The foundations of the dairy cow are laid in the first few weeks of a heifer calf's life. Why undermine these foundations for the sake of a gallon or two more in the milk can.

The cleanliness, warmth, and

ventilation of the calves boxes play an important part in calf scour. If, like Arthur, you put clean calves in dirty boxes you can expect the worst. There is nothing like a dry, light, airy and if at all possible, sunny calf box. Smooth concrete floors are the best, and don't treat your calves as one of the principal manure-producing units on the farm.

Another not uncommon predisposing cause of calf scour is the exposing of a cow and the new-born calf in the open market. The calf is usually muzbled so that it doesn't suck and reduce the appearance of the cow's stocked-up udder.

Exposed to Infection

They are brought back from the market where the calf has been exposed to all manner of infection and the starving calf is then allowed to suck the cow. The result, as you can imagine, is acute overloading of the stomach and another "sitting bird" for bacillus coli.

Well there you have the main predisposing causes of calf scour. It is highly infectious and, especially on a farm where it has never occurred before, the death-rate is high.

At the first sign of a scouring calf, isolate at once and ring your vet. Remember he can only cure the sick ones and advise you for the future. Don't be like Arthur and ignore the advice. The prevention of calf scour is up to you. Colostrum, cleanliness and careful feeding. There is your main line of defense against bacillus coli.

Old Farm Buildings Not Suited for Present Needs

America's changing agriculture requires a new type of design for farm buildings. J. C. Wooley, Missouri agricultural engineer, says today's farm buildings need special emphasis on functional design. Changes of the last two decades require that some of the customs and traditions need to be dropped and new practices begun.

These changes affect functional design of buildings, he says, in that the tonnage of crops to be handled and the number of animals to be cared for have been doubled and, at the same time, the help available to do the work has been reduced by at least 50 per cent. The bottleneck, once in the field operations, has shifted to the farmstead.

Missouri News Service

The Agricultural Act of 1954

To understand and take advantage of the new farm program, study its provisions . . .

Condensed from Michigan Farm Economics

Arthur Mauch

THE New farm program becomes effective Jan. 1, 1955. It will not solve the farm surplus problem, and it will not mean cheaper food for consumers in 1955. Economically, it may indicate a change in direction of price supports more in line with supply and demand conditions. Politically, it was an issue in November and will be in Congress next year.

Flexible price supports from 82.5 to 90 per cent of parity become effective for wheat, cotton, corn, rice and peanuts. Unless Congress acts again next year, the lower range will be 75 per cent in 1956. Also wheat, corn, cotton and peanuts on which the "old" parity formula applies, will have the parity price dropped 5 per cent in transition toward the new formula in 1956.

Tobacco was treated separately from other basics. As long as farmers accept marketing quotas, they will receive 90 per cent of parity.

Price supports for other basics will not automatically drop to 82.5 per cent. Stocks in the "set-aside" authorized will not count as "carry-over" in calculating supply which determines the level of support. (Set-aside stocks will be added, however, in the supply to determine acreage allotments and marketing quotas.)

Between 400 and 500 million bushels of wheat, and between 3 and 4 million bales of cotton must be set aside; and up to 500 million pounds of cottonseed oil, 200 million pounds of butter, 300 million pounds of nonfat dry milk solids and 150 million pounds of cheese may be set aside out of surplus produced prior to 1955. The total value must not exceed $2,500,000,000. These can be used for our national stockpile, foreign sale or barter, donation to school-lunch programs, for foreign or domestic relief, or sold

Reprinted from Michigan Farm Economics, East Lansing, Michigan, October 1954

in the open market if the price is at least 105 per cent of parity.

With the exception of wheat, which will surely be at 82.5 per cent of parity, enough can be set aside to allow support levels at or near the 90 per cent level. Hence, most of the reduction in farm income will be due to restrictions on production rather than reductions in support levels. Since only a small per cent of the finished product is made up of the farm price, there will be practically no effect on the cost of food or clothing.

The most drastic adjustments will be made by wheat and cotton farmers. There are indications that corn belt farmers will stay within wheat acreage allotments to avoid the penalty for excess wheat but will ignore other acreage allotments. If so, they will sacrifice any possibility of obtaining a support price of any kind for the privilege of continuing or expanding production of other crops as they choose. There is also reason to believe that many wheat producers will plant excess acreage and hope that the market price will be enough above the penalty to pay the additional cost of production. This is especially true where a premium price is received for high protein wheat.

Other Provisions

The agricultural conservation program is extended under federal administration for another two years. But farmers exceeding their acreage allotment for any basic crop are not eligible for ACP payments. This will even apply on 1954 crops not yet harvested and which could be adjusted into compliance. (The new tax law allows a charge off up to 25 per cent of gross farm income for certain of the more permanent soil and water conservation practices.)

Wool is to be supported up to 110 per cent of parity for the next four years to encourage an annual domestic production of 300 million pounds of shorn wool. Direct payments as well as loans and purchases are authorized. Direct payments must be used if the support level exceeds 90 per cent.

Milk and other dairy products will be supported at 75 to 90 per cent of parity. This is the first price support for fluid milk. More important: The Secretary has authority to dispose of surplus dairy products "by any methods determined necessary." The CCC has authority to give dairy surpluses to the armed services, and to the Veterans Administration for use in hospitals. Up to $50 mil-

lion a year of CCC money can be used until June 30, 1956, to increase fluid milk in grade and high schools. Up to $15 million a year can be spent in the next two years to eradicate brucellosis. Indemnities can be paid up to $50 per head.

Irish potatoes will be eligible for support prices between 0 and 90 per cent of parity if the Secretary sees fit. Mandatory supports are continued for tung nuts and honey from 60 to 90 per cent of parity.

Carryover allowance is increased for wheat in determining "normal" supply from 15 per cent to 20 per cent of domestic consumption plus exports. For corn it is increased from 10 to 15 per cent. Marketing quota provisions for corn are outlawed.

Agricultural attaches are authorized to be responsible to the USDA instead of the State Department. This is a move to have them play a larger role in promoting the sale of farm commodities abroad.

CCC feed grains can be sold at storage point for the current support price plus 10 per cent until March 1, 1955. This means a lower price to the buyer—the old law called for 5 per cent above support price plus cost of storage.

The recent attempt of the Secretary of Agriculture to limit the terms of office of county committeemen was declared illegal.

The Impact

Total output in agriculture has been running 2 or 3 per cent too high to obtain a market price for farm commodities near the support levels. This will change very little in 1955.

Cross compliance and more drastic controls of acreages will mean a shift to more roughage and roughage consuming livestock. In the long run, total output of agriculture will increase.

Next year the greatest impact on income will be on the producers of basic crops. In the long run, the livestock and dairy farmer will find that his competition has increased. The consumer will get more of the kind of things he likes to eat. The taxpayer will get a little easing of his burden, too. There is more of a chance for reducing price depressing surpluses under the provisions of the Agricultural Act of 1954 than was the case in recent years. However, this is not due to the price flexibility, which is negligible, but to the provisions for disposal of current government holdings. If this is accomplished, it will be easier to work out a sound price program for agriculture in the future.

NOW, Social Security for Farmers

Make plans right now to take advantage of the new Social Security Law . . .

Condensed from Missouri Farm News

ON January 1, 1955, a new social security law, passed recently by the 83rd Congress, will bring old-age and survivors insurance protection to most farmers and farm workers.

New legislation makes two important changes that affect farm people. Farm operators— people farming for themselves—have not been covered by the social security law up to now but beginning the first of the year, all of them who make as much as $400 profit in a year will have old-age and survivors insurance protection.

Farm employees—people doing farm work for others—are already covered by the law if they work regularly for one farm operator. The new law brings old-age and survivors insurance protection to all farm workers who earn as much as $100 cash pay in a year from any one farmer whether the work is regular or not.

In explaining how new legislation works, Coy McNabb of University of Wisconsin says self-employed farmers and workers contribute to a fund while they are working and when earnings stop because of death of the worker at any age, or his retirement at the age of 65 or later, payments are made to the worker or his survivors as the case may be.

Most persons who come under social security for the first time on January can become insured for the payment of benefits as soon as they have earned social security credits for at least one and one-half years and not more than 10 years in any case. Since farmers pay their social security tax once a year, it would really be two years before they could claim benefits.

Reprinted from Missouri Farm News, Columbia, Missouri

According to McNabb, the tax amounts to 2 percent of farm workers cash pay, this amount to be matched by employers. The money is sent to the Internal Revenue Service along with a list showing the wages and social security account number of each employee.

For farm operators, the tax amounts to 3 percent of their yearly net earnings. This is paid once a year as they make a social security report along with an income tax return. Maximum wages or net self-employment income on which the tax applies is $4200 in a year.

Any self-employed farm operator who expects to make more than $400 net next year should get a social security card from his local social security office free of charge unless he already has one, McNabb says .The first payment will be due when income tax reports are filed early in 1956.

Where farming is done on land belonging to someone else and regular cash wages are not paid, there may be some doubt about being self-employed or a worker, McNabb explains. The answer depends on the arrangement—the agreement between the renter and the landowner. McNabb gives some general guides but in case of doubt, he advises a visit with the nearest Internal Revenue or social security office.

If land is rented or leased for either money rent or any other kind of rent, and the renter farms it as his own, then he is self-employed for social security purposes. He then makes out a social security report, just as any other self-employed farmer, once a year and pays social security taxes if net earnings are $400 or more for the year.

If farming is done on shares and the agreement is that a share of the crop goes as rent for the land, the share-cropper is ordinarily considered self-employed for social security purposes.

On the other hand, McNabb says if the share arrangement is that the landowner, or other operator of the farm, pays a share of the crop, or of the proceeds from it, as pay for work, then the sharecropper is considered an employee.

An employer of farm labor is required under the law to deduct the 2 percent of wages paid for social security. It is important that the report show the name and social security number exactly as they appear on the card to insure proper credit toward benefits.

Social security offices are responsible for issuing social security account-number cards, for handling claims for benefits and for giving information about rights and duties under old-age and survivors insurance, Mc-

Nabb says. On any of these matters, or for general information or booklets on old-age and survivors insurance, get in touch with your nearest social security office. These are located in the larger cities and towns of every state and local postmasters can give the address of ones serving their areas.

Causes and Cures of Shipping Fever

Cause of shipping fever in cattle would no longer be a mystery to cattle buyers if they would ride cross-country under the same conditions as the animals.

Fatigue, changes in feed and environment, and weather changes enroute, bring on the same type of disturbance in cattle that a severe cold does for humans, says Dr. F. A. Hall, Purdue extension veterinarian. Symptoms of the ailment show up as coughing, running nose, loss of appetite, inflamed eyes and diarrhea.

In preventing the trouble, farmers should remember that shipping fever is as contagious for cattle as the common cold is among humans. Cattle purchased through a public stock yards may have picked up the germs and can carry the disease into a healthy herd. For that reason newly purchased cattle should be isolated for several days.

Keep cattle as comfortable as possible while they are being transported, Hall suggests. Provide dry bedding and protection from cold winds and rain or snow. If shipment is long distance by truck, provide for unloading to allow a rest period during which time the animals can be fed and watered.

Arrange to buy cattle during periods of settled weather if possible. Use all weather forecast information available to avoid sudden changes.

Hall recommends that newly purchased feeder cattle be kept in a lot that has protection against wind; don't put them indoors because they should have plenty of fresh air. Feed them lightly on roughage consisting of mixed hay or straw, plenty of salt and water, but no concentrates. Let them rest for several days.

If signs of the disease appear, early treatment by a veterinarian may prevent a death loss, advises the specialist. Modern sulfa drugs and antibiotics are effective if given early.

Purdue University

More Milk Per Farm

Fertile land is the key to high milk output on this Ohio farm . . .

Condensed from The Ohio Farmer

Howard L. Miller

CAN you produce 400,000 pounds of milk in a year on a one-man farm?

It sounds big, but a Wayne County, Ohio dairyman proves it can be done. Wayne Hostetler near Orrville milks 30 to 35 cows and gets an average of 1100 pounds of milk every day in the year. And, he does it all by himself.

"Large acreage, lots of family help, fancy equipment?" you ask. None of these—just about the same kind of cow business you'd find on any good northeastern Ohio dairy farm. The difference—there's more of it. The 135-acre farm has been producing at the rate of 1½ tons of milk per acre and keeps climbing. This production is maintained with no purchased feed, not even protein supplement!

As for labor, the oldest son is 5½ so there's not much family help. The equipment is handy, well-planned and cuts a lot of chore corners. "When you spend five or six hours a day just doing chores, you have to make your time count," says Hostetler. He continues: "Handling 20 tons of milk a month requires some conveniences or I just couldn't get it done."

There's the formula. It's really quite simple. Take a good farm, gear it to sound management and run it with lots of hard work and you've hit on the combination. It's a combination that showed a DHIA herd average for the last two years of just under 400,000 pounds of milk. In the two-year period, 37 cows produced over 10,000 pounds of milk and finished just short of

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio, September 4, 1954

400 pounds of butterfat per cow.

This year, if present production continues, the output may reach 425,000 pounds. The herd will average 35-38 cows with 15 to 20 head of replacements coming on each year. April—the beginning of pasture season—and December—when fall freshenings hit their peak—are top production months. An all-time high was reached in May when DHIA records showed a total production just over 40,000 pounds of milk for the month.

Suppose we take a look around this farm and gather the reasons for this top production. You'll find it's a good farm in a high state of fertility. Legumes are the number one crop. Nearly three-fourths of the total acreage is in hay and pasture. This year 75 acres are in alfalfa mixtures and new seedings.

The farm follows a rotation of corn-small grain-two years of legumes. The meadow crops are normally held two years but may be held longer if new seedings are thin and the old ones still are productive. "Old stands have been life savers in the past two dry summers," Wayne says, "We'd have been caught short if we'd had to rely entirely on the new seedings."

At the east end of the barn you'll see the "storage banks" of the roughage program. Two silos, a 12 by 40 and a new 16 by 40 are filled with grass silage. "A silo is the easy way to handle roughage," Hostetler contends. A conveyor, the conventional gutter cleaner type, moves silage along a barn-length feed bunk for winter feeding. He says: "All I need now is a silo unloader and I'll have push-button silage feeding."

Twenty-eight acres went into the silos in early June. A year ago the farm produced enough roughage to have half the smaller silo left over when cows went to pasture. By chopping green corn for six weeks last fall the silos were not opened until November.

Cows get all the silage they will eat during the winter. Silos that are fed out in summer and fall months will be re-filled with corn in September. During the winter months, the milking herd averages 50 to 60 pounds of silage daily.

Hostetler believes that chopping and hauling to the cows has a lot of possibilities. "I believe we could add 10 head to the milking herd by bringing pasture to the cows," he said. This summer seven acres of chopped legumes fed 60 cows for 14 days.

The productivity of the land is the key to the high milk output. After pasturing 24 acres of legumes and filling both silos, 1200 bales of first-cutting hay were made. Given normal weather, the farm will yield at least

that much more in second and third cuttings. A legume field cut in early June went back to corn, getting two crops on the same field for the year.

By keeping the farm in top fertility the crops can support large livestock numbers, even in dry seasons. New seedings get 350-400 pounds of fertilizer and are top dressed at least every other year with a like amount of 0-20-20. Corn was fertilized with 400 pounds of 4-16-16 and manure is used liberally. The yields have to be good to furnish all the feed for 50 to 60 head of cattle on 135 acres.

Inside the barn are dozens of shortcuts. They save countless hundreds of steps, hours of time and lots of bending and lifting. Summer chores take six hours a day—in winter two more are needed. The 35 cows pass through the nine-stall milking parlor in a little less than two hours and a half. Four or five stanchions can be open at once to change cows in the parlor. A holding pen keeps another group ready to come in. Grain flows down an overhead chute to a cart in front of the cows and only seconds are required for feeding.

Hostetler uses a three-unit milker and says it works well with only one man. After milk is dumped through the strainer, a can cart is used to pick up the cans in the milk house. Sometimes there are as many as 18 a day and this saves a lot of lifting. An electric hoist swings the cans in the cooler and back out again to a roller conveyor. When the cans are dropped from the hoist they roll right to the truck door.

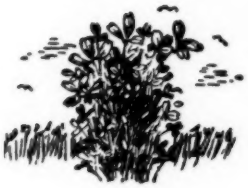
Of course it takes long days to produce a thousand pounds of milk on a one-man farm. With a lot of time required for chores, field work has to move swiftly. The farm equipment includes a forage harvester, baler and the usual roughage handling equipment. Some help is exchanged. This summer for instance he filled seven silos, including the two on his farm.

"When I operate equipment worth $12.50 an hour and exchange it for labor, I get a lot of help in return for each hour I'm off the farm," is the way he looks at it. By exchanging help and equipment he is able to harvest all the roughage crops with little or no hired help.

Machinery lessons hours in the field and allows more time for milking cows, the job that returns the most money.

Machinery, high fertility and good management raise the potential for the farm even higher. "We aren't all the way yet," Hostetler sums up, "I believe we could milk 50 cows on this farm with the feed we could raise. Maybe that'll be a goal as the boys grow up."

Root Borer in Red Clover



Root borer causes red clover to die after first harvest year . . .

Condensed from Ohio Farm and Home Research

C. R. Weaver

WHY does my red clover die out after the first cutting? Red clover, a natural perennial, should live many productive years. Yet in many seasons it recovers slowly or not at all after the first cutting of the first harvest year. During that year the plants become unthrifty and the stand diminishes. Little or no red clover lives into the second harvest year in Ohio.

Root diseases and insects are almost completely responsible for the short life of the clover plant. The clover root borer tunnels in and destroys the root. While doing so it provides an entry way for disease organisms. The root diseases cause a breakdown of the transportation system within the clover root. Plants cannot obtain nutrients and water from the soil without a good root system.

The root borer has been a pest in Ohio at least since 1893 when it was reported destroying clover in Paulding County. Even though it has a long record as a pest, its importance has gone unrecognized by farmers. No control measures were known until after World War II when several new organic insecticides were developed.

The adult of the clover root borer is a brown beetle; the larva is a white grub 1/16 to 1/8 inch long. Both forms of the insect tunnel in the roots of medium red clover. The adult beetles fly to first harvest year fields in early spring—about the time spittlebugs appear. Beetles lay eggs from which the white larvae hatch. By the time of the second cutting, feeding of both forms usually is severe and the ability of the plant to survive and grow is diminished. The beetles overwinter in the old field and move to new fields in the spring.

Present recommended control measures in most states call for

Reprinted from Ohio Farm and Home Research, Wooster, Ohio, July-August 1954

the application of one and one-four pounds of gamma isomer of BHC or one and one-half pounds of actual aldrin per acre. The application should be made so that the insecticide is placed on the soil. Dry forms of the insecticide are usually more efficient than sprays for this purpose. The application can be made any time between August of the seeding year and late April of the first harvest year.

The Ohio Agricultural Experiment Station has recently developed a new and more efficient method of control. The method consists of placing the insecticide in the soil with the fertilizer used at the time of band seeding. The band seeding method eliminates the need for a special operation for application of the insecticide since the entire job is done with the regular seeding. Furthermore, the placement of the insecticide in the soil at the root zone makes the insecticide more efficient. Less insecticide is necessary with the new method .

To prepare the insecticide-fertilizer mixture, add three-fourths pound of actual aldrin to the amount of fertilizer to be used per acre. (For example: mix 1½ pounds of 50 percent aldrin with 300 pounds of 3-12-12 fertilizer if the clover is to be band seeded with oats).

After the clover has been band seeded, the insecticide remains in a band in the root zone of the clover plant. The insecticide is stable in the soil and remains effective until the next year (the harvest year) when the root borer adults enter the field to lay their eggs. Results with this new band seeding method have been effective in experimental plots at Wooster and show promise of being an effective control. The method is still experimental, however.

Control of the clover root borer often results in spectacular increase in second cutting yields and an increased survival of the red clover plants. Sometimes, however, diseases attacking the roots of red clover are so severe that, even though the root borer is controlled, the plants do not remain vigorous through the second cutting.

Wisconsin Pellets Hay

"Hay pelleting" is being tested at the University of Wisconsin. Their tests show that long and chopped hay can be compressed into pellets and can be stored in one-fifth or less of the space needed for hay in its original form. Results also indicate that hay in pellet form appears to keep its green color longer than loose hay. Present tests are being conducted to determine the effect of hay pelleting on milk production.

Better Farming Methods

Road to Rapid Gains in Beef

The high heritability of fast growth and its association with efficient feed use, point to herd selection as the answer to better gaining ability . . .

Condensed from The Shorthorn World

J. V. Craig and A. L. Neumann, University of Illinois

THE IMPORTANCE of breeding for fast gains or as commonly expressed, weight-for-age, in beef cattle has received wide attention in recent years.

Most purebred breeders want to consider at least three questions before deciding whether to stress this trait more. First, will fast gaining animals find ready buyers when sold either as breeding stock or as feeders? Second, can we be sure that demonstrated gaining ability in bulls and cows will be transmitted to their offspring or will we first have to run a feeding test on the offspring? Third, how is inherited rapid growth rate associated with other desired characteristics such as efficiency of feed use and desirable type?

More research into the inheritance of gaining ability and its relationship to other traits is needed. Nevertheless, there are certain preliminary results which should be of value to the progressive breeder in planning his future operations at this time.

Let us examine the first question from the viewpoint of the man with a commercal cow herd or from the viewpoint of the man who may eventually feed the produce of the cow herd. They are the men who ultimately may make use of increased inherited growth rate for producing beef for the consumer. Are fast gains desirable to the feeder? Obviously fast gaining animals have an advantage over slow gainers in getting to market in a shorter time.

Reprinted by permission from The Shorthorn World, Mt. Morris, Illinois, Aug. 15, 1954

This means less labor, a more favorable marketing time, reduced accident and death risk and quicker returns on investment.

Perhaps a more compelling reason for buying cattle with bred-in weight-for-age or growth rate is the known fact that the more rapidly gaining animal requires less feed on the average than the slow gainer. These are economic considerations which few cattle breeders and feeders will ignore if they are brought to their attention.

How effective is selection for gaining ability, or in other words can we be sure that more rapid growth rate will be passed on to the next generation? Investigations carried out in Virginia and Texas and by the U. S.D.A. at Miles City, Montana, indicate that gaining ability is heritable. It is reasonable to ask to what degree is gaining ability transmitted, that is, how effective is selection for gains? The actual estimates do not agree closely for all three stations. If these estimates are averaged, the conclusion must be that selection for growth rate should be at least moderately successful in developing fast gaining strains.

It is possible that the effectiveness of selection for this character may differ from one strain to another and from one breed to another. Where selection has consistently been practiced for a character over a great number of generations we might expect that it would become less effective. There is considerable evidence that this has not yet become true in beef cattle so far as gaining ability is concerned. On the other hand this might be the explanation as to why the heritability of type or conformation is somewhat lower.

Place of progeny testing

If selection is effective for gains (heritability is high) then the animal breeder comes to an interesting and useful conclusion. So far as this one trait is concerned the performance of the individual under standardized conditions is an excellent indicator of the transmitting ability of that animal. Progeny testing or testing of a sire or dam's offspring will add very little additional information for such a character and may be by-passed in order to shorten the generation interval, which is an important factor in making selection a more effective force.

It is quite possible that progeny testing may be desired in selecting for other traits which are not so highly heritable, for example, milking and mothering ability. In this situation the breeder would select only those individuals with exceptional gaining ability and then progeny test these selected

animals for the less highly heritable traits.

What about the associations of growth rate with other important characteristics? It has already been pointed out that more efficient feed use is associated with more rapid growth on the average. Some breeders may wish to emphasize feed efficiency independently in their selection program. If this is desired, individual feeding trials may be set up which will indicate the pounds of feed needed to produce a pound of beef as well as measuring rate-of-gain.

Is growth rate after weaning associated with the type of the calf at weaning time? Many breeders believe this is true, yet the evidence from a number of experiments indicates that there is essentially no predictive value from weaning type to subsequent gaining ability. Certainly good type can be combined with high growth potential but it does not appear to be an automatic relationship. Each character must be selected for, if improvement is desired in both.

There are some indications that those animals making the highest gains under standard conditions will grade higher at the end of the feeding period. This does not seem to be a close association however, so that again selection for both characteristics should be practiced. At least there appears to be no basis for the statement which is sometimes made that fast growing animals are necessarily of less desirable conformation than slow growers.

If the breeder is convinced that strong selection for rapid gains is warranted he has several alternative means of proceeding. Some men have unusual ability to estimate weights of animals and to make allowances for differences in age and in treatment prior to selection. Most, however, will do a better job by standardizing the conditions under which their prospective herd replacements and sale animals are kept, and by keeping careful records of individual weights, ages, and other pertinent data. Central testing stations operated by co-operative groups of breeders should offer opportunities for production testing under standard conditions.

Chart your course

Each man must decide what traits he wishes to emphasize and what importance he will attach to them. It is believed most effective, by many research workers, to select animals produced under the kind of conditions in which they are to be used. If bulls are being produced for sale to customers who will use them for siring calves which will be fed largely on roughages and pasture after weaning, then the

bulls themselves should be tested and selected under these same conditions. If, on the other hand, bulls are being placed in herds where the calves are full fed after weaning or are sold to feeders who full feed, then the bulls should be so handled and compared on this basis.

Carcass investigations at several experiment stations indicate that young bulls yield carcasses which are quite close in yield and quality to steers fed out under the same conditions. In addition bulls will gain faster and make more efficient use of their feed than will steers. Unfortunately, the market does not pay as much for young bulls as the carcass tests indicate they are worth. Thus bulls culled after a feeding test will not bring as much as if they had been castrated and fed as steers. This price difference is somewhat offset by the more efficient gains made by the bulls.

How then might a breeder proceed to select efficiently for more rapid gains? Briefly, he would attempt to remove all those environmental and developmental variables which affect the trait selected for, but which have no importance in the transmission of that trait. This is the same principle employed by the dairyman when he adjusts the milk production records of his cows to a twice daily, 305 day lactation, mature-equivalent basis. In the same way a test of gaining ability in feed lot might be adjusted for the initial age and weight of the animal since these are known to affect subsequent gains and are due in part to factors other than the inheritance of the calf, namely, the date born and the milking ability of the dam.

Such adjustment factors are being worked out and published by many of the state experiment stations and may be had for the asking.

One useful procedure which should be used as much as possible is to compare animals of about the same age and which have been previously managed in the same way. Animals of about the same age can be obtained by bunching the calf crop. The smaller the adjustments which are needed the less chance of error. The period in which individuals are compared should be long enough (perhaps six months) to allow the animal to fully express their inherent differences in growth potential or efficiency of feed use.

* * *

Extension engineers at Ohio State University report that a recent corn crop in Iowa cost 326 fingers, 63 hands, 14 arms, five legs, three lives, 3,362 lost working days and $71,243 in medical expenses.

DETERGENTS FOR BLOAT PREVENTION

Recent experiments show a new preventative is effective in controlling bloat. . .

Condensed from Successful Farming

FIELD trials this summer may give us the answer to preventing bloat. Dr. Roy E. Nichols, University of Wisconsin veterinarian, will run tests on several farms this summer using a number of detergents as bloat preventatives.

In tests so far, detergents have given good results as bloat stoppers. Here is Doctor Nichols' theory on bloat—and why detergents prevent it.

First, if a cow can belch, she won't bloat. And the troublemaker that seems to prevent belching is the fluid level in the paunch or "stomach" of the animal.

Feeds cause trouble. Different types of feeds have different effects on the fluid level in the paunch. Hay floats on top of the paunch fluid, grass stays near the top, legumes sink into the fluid, and grain sinks all the way to the bottom.

According to Doctor Nichols, the sinking of legumes and grain is the reason these feeds are the two commonest causes of bloat. As legumes or grain sink into the paunch fluid, the fluid level is raised. If the fluid level is raised to the point where it is above the entrance to the paunch, the animal cannot belch, and bloating occurs.

What the detergents do. Detergents—there are many different types—seem to do two things which prevent bloating. First, some detergents seem to "hold up" legumes, preventing their sinking into the paunch fluid. And second, some detergents seem to get rid of the foam on the top of the paunch fluid.

In the tests already conducted, Doctor Nichols has fed a common household detergent to dairy animals. The detergent was fed in loose salt—1 part of detergent to 4 parts of salt. Results were very good. The biggest difficulty in this practice,

Reprinted by permission from Successful Farming, Des Moines, Iowa

according to Doctor Nichols, is in getting the animals to eat enough of the detergent every day.

Must be fed daily. A definite daily intake can usually be given dairy animals by mixing the detergent with the feed fed in the barn. But for beef cattle on pasture, salt seems to be the best detergent-carrier at the present time.

Salt blocks containing detergent material, and detergents in a cereal base for feeding with grain, are on the market. But Doctor Nichols' tests this summer should provide on-the-farm proof of the real value of detergents.

Poor Nutrition Causes Low-Profit Sheep

A University of Minnesota sheep nutritionist blamed "neglect and poor nutrition" for the low-profit troubles of many farmers who raise sheep. Robert M. Jordan says that "until the attitudes that sheep can live on almost anything and that an economically-efficient unit consists of 20 sheep or less are abandoned farmers can expect only low profit from sheep raising."

The goal should be the most mutton per acre of land, he said. It is achievable if farmers get and make use of good feeding and management knowledge, developed by college and feed industry research.

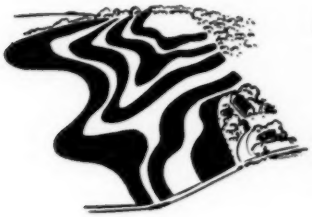
He pointed to New Zealand's "enlightened flushing program" which increases by a fifth the number of lambs born per ewe. More twins were born to flushed ewes and best results came when the flushing period lasted about five weeks—that is, two weeks before putting the rams out and during the first three weeks of the breeding period.

Also important is how well the ewe is fed during her gestation period. South Dakota, Canadian and Montana college researchers found that well-fed ewes gave birth to 20 to 30 per cent more lambs than ewes fed poorer-quality rations. Well-fed ewes also produced healthier lambs, "mothered" them better, produced more milk for them and, of course, boosted the lambs' weaning weights.

Poorly-fed flocks also are hard hit by "pregnancy disease," which usually strikes ewes carrying twins in their last six weeks of gestation. Jordan said, "We know now that exercise will neither cure nor prevent pregnancy disease. Only good feeding that lets the ewe gain weight and grow healthier prevents it."

University Farm News

Floods Start at the Hilltop



A new program for keeping good, black top-soil from washing down stream gets under way . . .

This illustration and others in this issue were drawn by Felix Summers and furnished Farmers Digest by the Soil Conservation Service to further the cause of good land use.

Condensed from The Farmer

RUN-AWAY raindrops are finding it harder to get from ridge to river in some 60 watershed areas of the United States. They will have a tougher job trickling into floods since the U. S. Soil Conservation Service took a second step in its mammoth job of soil and water conservation.

SCS, a year ago was given the third leg of a three-legged program designed to keep good, black topsoil from tipping into downstream rivers.

What has been accomplished? How has this new leg—watershed protection—niched with on-farm conservation and downstreams flood control? What has this "logical next step," as National Administrator Don Williams calls watershed protection, done for conservation?

Briefly, a start has been made to nip floods where they begin, on the hilltop. A bond has been forged linking on-farm practices, upper watershed retention and downstream flood control into one strong chain. Groundwork has been laid for continued rapid advancement in the four years that remain under this pilot program.

Soil and water control on a watershed basis is not new to SCS. But watershed protection, on the nation-wide breadth which Congress last year outlined, is new.

Since its inception in 1935, SCS has given farmers on-farm technical assistance. When asked, technicians have also helped coordinate soil and water-holding efforts.

But those projects were limited. Most farmer-cooperators and SCS technicians were forced to confine their efforts to individual, on-farm practices. Water that ran off farms wasn't stopped. It, and the rich topsoil it carried, kept moving until it hit flood control projects of the

Reprinted by permission from The Farmer, St. Paul, Minnesota, July 17, 1954

Corps of Engineers far downstream. Floods weren't being retarded on hills where they started.

Lack of a connecting link from farm to river began to become apparent. Landowners, as they learned the benefits of farm conservation practices, began to visualize additional group action in the watershed. They saw the need for measures that could cut across farm, township, even county lines—measures no individual could accomplish alone, but which would benefit more than one farm. Army engineers discovered more than half their annual flood damage was being done in the headwater areas where most farms lie.

Realizing the need for that "logical next step," Congress last summer appropriated additional funds to the Department of Agriculture. Twenty-nine million dollars was earmarked for SCS use in pilot projects to "develop, refine and evaluate methods and benefits of protection in small watersheds."

The first year of that watershed project has been completed. Here's what was accomplished.

First, some $5 million was spent by the federal government. An equal or greater amount has been spent by landowners and operators, state, local, and private groups.

Farmers have stepped up on-farm contouring, strip-cropping, terrace-building, renovation and reforestation.

Nationally, the upstream program will call for 1,900 stabilization and sediment-control structures during these first five years. It will cover approximately 4,700 square miles. About $70 million dollars will be spent—$34 million by landowners and operators, $7 million through state and local funds, and the rest by the federal government.

From that investment farmers will get back approximately two dollars for every one spent. Their return will be represented by water for irrigation, soil that stays in place, higher crop yields and fewer machinery breakdowns. Down stream, farmers and city-dwellers will get more flood protection, less silting of rivers and waterways, and better improvements. Rain will remain where it falls on the hilltop.

Grazing Habits of the Cow

How does a cow spend her time while grazing pasture? According to workers at the Virginia Experiment Station, cows on a grass-legume pasture spent 9 hours loafing, and 8½ hours ruminating. For the 24-hour grazing day or period, 51 per cent of the grazing was done at night, and 15 of the 24 hours were spent in a standing position.

He Sells His Hogs the Year 'round

This Illinois farmer justifies costly equipment by raising a fast-gaining meat hog and farrowing seven times a year . . .

Condensed from Farm Journal

Ray Anderson

FOR the last year I've been looking for farmers who are taking some of the gamble out of the hog market by selling pigs the year around.

I've found several who are doing it, and they're satisfied that it's making them money. One of them is Laverne Johnson, a 43-year-old tenant in DeKalb County, Ill. He's got a lot of hog-raising ideas that I believe will interest you.

This is Johnson's situation: His landlord, Herbert A. Knight, who lives in a Chicago suburb, built a 20-pen farrowing house on the farm that "has everything" — furnace, thermostat, ventilators, feed and bedding storage, insulated walls and ceilings, and concrete floors that have vermiculite instead of gravel in the mix. It would probably cost about $20,000 to build that house today.

But Johnson uses the building overtime. Let's follow him through the 1953 hog year:

- He farrowed seven times —December, January, February, March, late June, August, and September.
- He had hogs on the market every month of the year except November.

That's one way Johnson justifies the cost of the house to his landlord, brings down the "rent" per sow farrowed to less than the average central house that shelters only two litters a year.

He justifies the cost of the setup in two other ways, too. One is that he can do a good job easier and better with his dead-of-winter litters. He farrows, as noted above, from December through March—at a time when most

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

hog men are "laying low." Those hogs get to market when receipts usually are down and prices up.

The other thing is that Johnson selects for a fast-gaining meat hog that the market likes. His litters come big, and don't waste any time getting to market weights. His '53 shotes ranged from only 160 to 200 days of age and weighed from 210 to 230 pounds when sold.

"We never once missed hitting or beating the Chicago top on the weights we sold," says Johnson.

Johnson and Knight (they run the farm on a 50-50 lease) are now using Yorkshire, Minnesota No. 2, and Hamprace boars on their criss-cross sows.

The boars are from production-tested herds without exception. "We keep production records on our sows," Johnson explains, "and if we didn't use boars with records as good or better we'd be losing ground. They cost a little more money, but that is more than paid back by the gain we get."

Johnson is a bug on clean pens. He has to be, when the house is used so frequently. The pens are steamed and disinfected between farrowings. Each sow is thoroughly washed before she is penned. She also gets a sprinkling of BHC solution to kill lice and mange.

New pigs are served a mixture of black dirt and aureomycin to control scours. Johnson uses the amount of the antibiotic recommended by his veterinarian, and mixes it with a shovel.

He vaccinates all pigs twice to control erysipelas — at 2 or 3 days of age with serum, and at three weeks with serum and culture.

To prevent cholera they get modified live virus and serum at six weeks.

"Flu is no problem," Johnson says, "if you keep pigs clean and dry and give them fresh air." He says he has had no baby-pig disease, and very little trouble with rhinitis.

The pigs get a dry commercial starter in a creep as soon as they will eat. When they are seven to eight weeks old, the starter is replaced with a home-mixed 18%-protein ration. After weaning they go gradually to shelled corn and balancer pellets. He buys pellets, and most commercial feeds, in bulk by truckload.

That 20-pen hog house is farrowing quite a few pounds of pork for Johnson and landlord Knight. Last year they raised and sold 1,171 shotes (272,030 pounds) from 149 litters.

These figures may interest you: it took 1,265,402 pounds of all feeds to produce that pork, including 17,529 bushels of corn, 2,479 bushels of oats, 194,450 pounds of protein feeds, and 5,518 pasture days.

New Help for

TREE FARMERS

Wood using firms spur harvesting of forest cash crops . . .

Condensed from The Wall Street Journal

Lamar S. Mackay

INTERNATIONAL Paper Co. experts moved into tiny Louisiana farming and oil community one morning, recently, gave a farmer a hand with harvesting one of his crops and left a few hours later.

The crop was 10 acres of trees on the 600-acre farm of F. F. Vickers, a 68-year-old native of the pine woods country. He's moving some of the crop to market.

Mr. Vickers is a member of the nation's growing family of tree farmers. Much as other farmers grow cotton, wheat or tobacco, they raise repeated crops of trees to sell for cash. It takes longer for their first crop of slow-growing trees to come in, of course, but subsequent crops can be harvested regularly.

"You cut only so much and leave the rest for future harvest," says slow-talking Paul F. Hursey, chairman of the Texas Forest Industries Committee, a group which is sponsored by wood-processing firms and promotes tree farm activities in Texas. The trees left to grow serve to provide a natural reseeding and reforesting of the cut-away area.

Natural Reseeding

For example, the paper experts that visited Mr. Vickers' farm helped select and mark the trees he is now cutting. They're being sold for pulpwood. Healthier, faster-growing trees are being left to grow into saw logs and poles which will bring better prices—and will help to reseed the cut-away areas in the meantime. In marked contrast, where such so-called selective

Reprinted by permission from The Wall Street Journal, Chicago 90, Illinois

cutting is not practiced, timber cutting leaves lands denuded.

The help Mr. Vickers received from the International Paper forestry experts is typical of what numerous wood-using concerns are doing these days to aid farmers with their tree crops—and assure themselves a steady supply of timber for their mills.

Paper Cups, Newsprint, Furniture

From these tree farms is coming a bigger supply of raw materials for such consumer goods as paper cups, milk containers, grocery bags, newspapers, rayon fabrics, photographic film and many other items. Also, add to this an increasing quantity of timber being grown for transformation into building materials, furniture and the like.

Figures compiled by the American Forest Products Industries, Inc., an organization of wood-processing companies, provide the best gauge of tree farming's fast growth. Back in 1948, only 1,633 woodlots covering 17 million acres met A.F.P.L.'s exacting standards as to proper forestry practices. "Certified" farms now number 5,501, covering 31.8 million acres. Though still a small segment of the country's 461 million acres of commercial forest land, this acreage is about the equivalent of the land area of all of New York State. There are a lot of woodlots, of course, which just aren't certified.

The tree farmers range from the big wood-using companies themselves to doctors, merchants, clerks, regular farmers or even college professors who raise timber in their spare time on plots sometimes as small as five or ten acres. Many wood-processing companies supply seedlings at no cost or at a nominal fee to such private landowners.

Much of the nation's tree farm activity, which got under way 13 years ago in the Pacific Northwest and has since spread to 36 states, is now taking place in this vast Southern pine region which covers 11 states and stretches from Virginia to Texas. Over 19 million acres, or just a shade under 60% of the U.S. tree farm total, are located in this area, which produces about 40% of the nation's lumber supply and more than half the pulpwood consumed by U.S. mills.

Drive through the South and you'll see new young forests rising above vast areas where once stood heavy virgin timber growth, later swept clean by so-called "tree miners." Foresters will tell you that timber is now being grown faster in some sectors than it's being cut. In other areas, it's approaching that state. The bulk of future U.S.-timber production will come from these lands, they predict.

In the past, the custom was to quickly convert the plentiful virgin timber into lumber at the lowest possible cost, then move the sawmill. But with today's high-cost mills, rising production demands and fewer available timber lands, plants are anchored down to a given spot. The main problem now is having a ready timber supply close at hand, and a continuous one. Hence the growth of tree farming.

Arkansas Symbol

Huttig, Ark. symbolizes the new era. Huttig sprang up with the building of a sawmill around the turn of the century. A week and a half ago, the town celebrated its golden anniversary with ceremonies marking the completion of an extensive 16-month modernization of the mill, now operated by the Forest Products Division of Olin Mathieson Chemical Corp.

The mill draws on a 250,000-acre tree farm tract in Arkansas and Louisiana, a part of the company's 450,000 acres of land holdings which reach over into East Texas.

Last year, more than 5,000 foresters were employed by U.S. wood-using firms, compared with about 1,000 in 1940. Another 1,200 were engaged as consultants.

Smaller Landowners

Of course, not all these foresters supervise company-owned land. Many of them are sent out to advise smaller landowners such as farmer Vickers on tree farming techniques. Such smaller private woodlands are filling a substantial part of the annual needs of U. S. lumber, pulp and paper mills.

Says St. Regis Paper's Mr. Ferguson: "The bulk of our supply of pulpwood comes from individual tree growers. For our Pensacola and Jacksonville mills, we purchase 75% of the pulpwood from farmers and tree growers. The balance comes from our own company lands."

And a Texas sawmill executive has this to say: "We wouldn't be in business if it weren't for the timber we buy from small woodland owners."

Second in tree farm acreage is Washington, home of the nation's first tree farm—the 120,000-acre Clemons tract of Weyerhaeuser Timber Co. in Grays Harbor County, dedicated in June, 1941. Next in line are Oregon and Arkansas, then Alabama and Florida. California, Louisiana, Georgia, South Carolina and Mississippi follow in order.

How to Do It

How does a landowner get into tree farming?

First, he requests an inspection of his woodlot by the forest industries committee which promotes tree farm activities in his state. The committee assigns

a professional forester to go over the woodlot, determine whether it meets all requirements. If it does, the forester will recommend certification.

Public ceremonies usually are held where all new tree farmers in an area are presented with certificates. The tree farmer pays no fees, is not required to join any organization. Periodic inspections are made to make sure the landowner continues to follow good forestry practices.

Perhaps the main drawback to the business is that tree farming is a long-range proposition. As one Texas sawmill official puts it: "You plant and your son harvests."

Success Stories

Nevertheless, some tree farmers who got into the program early or who had good timber stands on their land already have reaped good profits.

H. N. Perry of Emerson, Ark., for example, has sold about $14,000 worth of forest products from his land, helping to send three children through college. Profits from a 15-acre tree farm have paid for a new barn and other buildings, as well as hardwood floors in the home of O. E. Smith, Whiteville, Tenn. Other tree farmers have used their earnings to pay off mortgages, buy other property or build new homes.

New Use For Firecrackers

Ingenious use of firecrackers resembling tiny bombs have given farm crops protection from damage by night foraging deer and predatory birds in several areas. Fuse ropes of various lengths hung in fields with the firecrackers inserted to explode at fixed intervals did the business.

In a trial, 48 feet of fuse rope was placed at two locations in a peanut field visited by deer. The fuse was lighted at 9 p.m. nightly and allowed to burn until daylight, while firecrackers inserted in the rope were spaced to explode at about 45 minute intervals.

The experiment proved so satisfactory that additional fuse ropes of five and seven feet were used nightly. Results indicated the firecracker method would work, but once commenced must be used nightly or the predatory animals would re-enter the field being protected. Wildlife Specialist R. E. Callender noted that deer didn't linger in the field after an explosion; but also observed that unless explosions occurred at fixed periods nightly, "The deer didn't run so far."

Texas A. & M.

YOU CAN HAVE PASTURES LIKE THESE

Three best ideas for earlier grazing, with bonuses in more total production, higher protein, and greater palatability . . .

Condensed from Successful Farming

George D. Johnson

THERE is no substitute for early spring pasture. It marks the end of winter chores, it ups the milk check, and meat animals that are under medium winter-feeding levels pick up again.

You'll swing open the gates 1 to 6 weeks earlier next spring, using one of the ideas discussed here.

First is a slick permanent-pasture program advocated by C. J. Chapman of the University of Wisconsin. His recommendation — simply top-dress 500 pounds of 10-10-10, 12-12-12, or other high-nitrogen mixed fertilizer on permanent pasture in late fall or early spring. What will happen? In 300 tests of this practice all over Wisconsin, pasture yields averaged only 2,866 pounds of dry matter for untreated, 6,052 pounds where treated.

The fertilizer cost $18.25 per acre in these tests, and the net profit the first year averaged $61.40 per acre. Other states have had about the same increase. Included in this profit is the 2- to 4-percent increase in protein you get from the treatment. Not included is the value of the fertilizer carryover the second and third years.

Pasturing can begin 1 to 2 weeks earlier, and summer dormancy is delayed so this doesn't mean just a big flush of pasture at a time when you already have plenty.

Second—and another part of Chapman's program—is the use of straight nitrogen on grass pastures. This is also recommended in other states. From 40

Reprinted by permission from Successful Farming, Des Moines, Iowa, September, 1954

to 80 pounds of actual nitrogen in any of the forms now available will have the same effect as the mixed fertilizer if you know that soil tests show medium or above for phosphorus and potash, or if you applied mixed fertilizer the previous year. Straight nitrogen costs less than mixed fertilizer.

Here are more facts on use of nitrogen on pasture, found by H. A. Cate at the Dixon Springs, Illinois, Experiment Station: Bluegrass responds proportionately better than do most other grasses like bromegrass or orchard grass. Bluegrass production was increased 155 percent, against 61 percent for tall fescue in one Dixon Springs test.

However, the nitrated fescue totaled 3⅔ tons of dry matter per acre whereas the nitrated bluegrass totaled about 2⅓ tons per acre. The bluegrass simply started lower. Nitrogen also delays maturity, adding about a week to 10 days to the "tail end" of the spring grazing season.

A late-spring application of nitrogen will boost the grass only if ample rainfall follows. Also, natural summer dormancy of the grass plants reduces the response.

Additional reasons C. J. Chapman gives for using these two fertilizer-on-pasture programs:

1. By thickening the turf, water-holding capacity is increased and erosion is slowed.

2. Fertilized pasture chokes out many types of weeds and reduces grub damage.

3. Pasture improvement lowers feeding-production costs in a time of lowering dairy prices.

4. Fertilized pastures cut down on cash outlay for protein feed supplements.

5. More pasture means less hay and silage to feed, thereby cutting labor and machinery costs.

Our third pasture idea involves a special seeding and is the champ when it comes to early pasture. Rye or winter barley can be grazed an average of 30 days before bluegrass—then it can be rotated with bluegrass another 6 weeks. You can figure on from 70 to 100 animal unit days from rye or barley, including fall grazing.

Rye and barley are Hessian-fly-free, giving them an advantage over wheat for early seeding. Seed rye in September and seed it thick unless you plan to sow legumes or grasses in it. You can figure the cost of a rye seeding at about $4 per acre with $4 more if you fertilize. Sow about an acre for each animal unit you plan to pasture on it.

Try one of these three easy ideas for pasture improvement.

THERE'S CASH IN COVER CROPS

By fertilizing crops in the fall, Seabrook Farm has increased vegetable production 40%. It gives them better cover crops carrying more nutrients . . .

Condensed from New Jersey Farm and Garden

W. S. Meserall, Jr.

FEED the cover crop this fall or winter that feeds next year's cash crop and you'll build better soil, get better yields, save fertilizer and save money.

Seabrook Farms, of New Jersey, proved this principle in the laboratory 10 years ago, and have since applied the practice on a large scale with the result that vegetable production has increased 40%. What's more, this idea of fertilizing the cover crop before plow down is just what the doctor ordered for poor soil.

Dr. Benjamin Wolf worked out this principle while at Seabrook Farms with Dr. Frank App, director of research and development. As their work progressed, they became truly enthusiastic.

Better Cover Crops

They found that crops and beans were as good or better where fertilizer was applied on the cover crop some time before plowing compared to results when the same amounts of fertilizer were applied directly to the crops. What's more, the cover crop itself was larger and each pound of it carried more nutrients. Further tests showed that the fertilizer could be applied almost anytime in the fall or spring to the cover crop already established, even in open winters.

Plowing in extra nitrogen with the cover crop has been common practice for years, but applied earlier it gives the cover a chance to yield more organic matter. Plowing under residues of crops and cover crops with long-lasting nitrogen—such as cyanamid—has been particularly

Reprinted by permission from New Jersey Farm and Garden, Sea Isle City, N. J., September 1954

beneficial for early crops like peas.

"We didn't think it would work, this idea of fertilizing cover crops on poor soils," recalls Dr. Wolf. "But, on second thought, Nature regenerates plant life that way. Decaying vegetation releases nutrients which feed plants that are growing now. These in turn fall to to the earth, rot and release nutrients for the succeeding crop. All we do is give Nature a boost. We build up organic forms of fertilizer from cheap inorganic sources. What's more, less leaches out when it is needed, we can use more nitrogen than would be safe otherwise and we are constantly improving the soil—better structure, less erosion."

Dr. App points out that a well-grown cover crop contains as much plant food per acre as a ton of high grade fertilizer, and as much organic matter as a 10-ton application of manure "You might say that this method makes your cover crop a fertilizer factory—operating out of season when it doesn't tie up anything —and at the same time it earns dividends in terms of protection for your soil from wind and water and compaction," he observes.

The system is used on rye and rye-grass, on such winter cover crops as wheat and barley and annual summer cover crops like Sudan grass and corn. It has been used for many cash crops besides peas and beans, including tomatoes, cucumbers, sweet corn.

When do you apply fertilizer, and how much?

If the cash crop grows quickly, and in cool weather, it would be safer to apply some fertilizer directly to the cash crop—maybe half to the cover crop and half to the cash crop.

Fertilizing Corn Cover Crop

Here's what some farmers do with a summer cash crop like corn, where soils have adequate phosphoric acid and potash: cover crops respond best to nitrogen, so they put it on the cover crop, at the rate of 50 to 100 pounds per acre (equivalent to 150-300 pounds of ammonium nitrate), then use a mixed fertilizer low in nitrogen on the corn.

It's best to put fertilizer on the cover crop shortly after it emerges. If it is a late fall crop, wait until late in February or March. Where the cover crop is doing well without fertilizer, a nitrogenous fertilizer like cyanamid can be used at plow down.

Seabrook Farms and other large operators have their soil analyzed after the cash crop is removed. This is to determine what they will need to grow the next cash crop. In goes the cover and on goes some of the fertilizer. Here's how it works at Sea-

brook, as described by Dr. App:

Whenever possible, a crimson clover-rye grass mixture is seeded up to the first week in September. Whatever nitrogen is sacrificed by using a legume-grass mixture instead of a straight legume is more than compensated for by the insurance of sowing two seeds and by the greater bulk of the grass. Thereafter, rye grass, barley and wheat are seeded until November. In November, Seabrook switches to rye.

If the seeding does not contain a legume, Seabrook trys to get some nitrogen on in the fall—usually not later than October. Sometimes for a late seed crop like rye, no fertilizer may be added until it starts to grow in very early spring. Usually rye needs nothing but nitrogen, but sometimes phosphorus is added. Most of the Seabrook soils are high in potash.

Less Total Fertilizer Used

Total fertilizer for both cover and cash crops is usually the same as once used for the cash crop alone. Seabrook always plows under nitrogen fertilizer —cyanamid preferred because it is less likely to leach. Dr. App flatly declares that use of ammonium nitrate before or at planting time in spring for cultivated crops is "not good practice." Heavy rains, he says, will leach out all the nitrate. By putting down a long-lasting nitrogen through the cover crop, Seabrook has entirely eliminated much of its side dressing.

"We also have reduced the total amount of fertilizer," observes Dr. App. "In one of our main crops, we are using less than half the fertilizer we used before. Yet yield and quality are higher."

Feeding the crop that feeds the cash crop puts nutrients into non-leaching form, makes it long-lasting throughout the growing season, builds soil structure, and—perhaps as important as anything else—puts the plant food in the root zone. In a dry year, this becomes extremely important . . . especially if you have no irrigation.

Don't Overfeed Sows

Hog producers are urged not to overfeed sows at farrowing time. For best results, the American Veterinary Medical Association advises, sows should not be put back on full feed for at least a week to ten days after farrowing. The first day it is best to give nothing but warm water. Bran mash or ground oats can be fed on the second day. This is gradually increased until about the tenth day, when the sow should be eating a normal ration again. Aside from benefiting the sow, this method helps prevent scour in nursing pigs. *New Mexico Extension*

Central America's Counterpart of 4-H Gains Support

Agricultural clubs for young people gain headway under good leadership . . .

Condensed from National 4-H News

"EVERYBODY is well agreed that 4-S clubs have made a good beginning in helping to train the youth from whom will come the farmers and homemakers of tomorrow—the ones who will make possible the development of the agricultural resources that constitute the backbone of Panama."

This last paragraph of the annual report for the first year of youth work in this tiny Republic is both a summary of the work and a prophesy for its future in Central and South America. Once again the technicians seeking to improve agriculture have turned to youth, for through the flexibility of young people will come adoption of better farm and home practices with resultant increase in agricultural yield and improvement in living.

An Agricultural Extension Service was begun in Panama in January 1953, headed by a director and patterned closely after Extension in this country. Albertano C. De Baca, former New Mexico 4-H'er, was the Point Four advisor who helped with the organization and authorized the report.

By March a 4-S Advisory Committee was organized, and in May the first clubs were formed. During the year 35 clubs were organized with 1,348 members carrying 1,392 projects. For this year, project choice was limited to vegetable gardens, home orchard, poultry, hogs and sewing. These are all of immediate importance, varied enough to attract most boys and girls, yet few enough so a totally new organization could handle necessary instruction.

Considerable ground-work was necessary before club organization could begin. This included preparation of materials, including translation from English and adaptation to local situations. A 50-page leaders' manual was written, usable

Reprinted from National 4-H News, Chicago, Illinois

in Panama, Ecuador and Honduras. Other materials include the secretary's record book, project books on crops, and sewing, enrollment blanks and club and individual member record cards.

With background material in hand, workers were ready for organization. Local Extension workers had selected prospective communities for clubs, talked with parents, prospective members, leaders and others. Mr. De Baca, with National Leader Efrain P. Rodriguez and his assistant, Ofelia Hooper, worked with each agent, to organize a club, thus demonstrating how it should be done. Twenty clubs were started in this manner, and agents were asked to form as many more as they felt could be supervised.

Perhaps the effectiveness of 4-S work can best be shown by excerpts from Mr. De Baca's first year's report:

"The work has been accepted by the agents as one of their most important activities and they have had the sincere support of the Director of Extension as well as that of the Secretary and the Minister of Agriculture. The parents and the communities feel that 4-S club work not only gives their children valuable training, but it also keeps them busy . . .

"The 4-S clubs awake such community interest that, in the Penonome Agency in the Province of Penonome, eight different local livestock and dairymen donated eight calves for club members. . . .

"Local business concerns have also started to support the program. For instance, the local Sears Roebuck store recently donated 10 Duroc Jersey pigs between three and four months old to the Extension Service to be given to club members. . . . This same concern also donated some garden tools and sewing material."

Another former New Mexico 4-H boy is N. C. De Baca, usually called Nick. He is currently working in El Salvador under Point Four helping to organize the 4-C clubs there. He points out that most Central and South American countries are adopting fairly standardized versions of either 4-S or 4-C clubs in the hope that the organization will become international.

Nick, who had the privilege of helping organize 4-S clubs in Bolivia in 1948, reports that El Salvador, Honduras, Costa Rica and Panama in Central America have the youth clubs, as do most of the countries of South America.

In general, clubs in Latin American countries are similar to the 4-H Clubs, C's and S's being used because they adapt better to the language than does the H. All use the same four-

leaf clover insignia, motto, colors, and almost the same pledge and creed.

4-S, by the way, includes Salud, health; Servir, serving; Sentir, feeling; and Saber, knowing. The 4-C's stand for Cabeza, Head; Corazon, Heart; Conocimiento, Knowledge; and Cooperacion, Cooperation. There is a slight word variation between countries.

4-C clubs started in El Salvador last year with every agricultural agent in the 14 departments (states) required to have several pilot clubs by the end of the year. The experiences connected with the organizing, according to Nick De Baca, have been about the same as with clubs in Panama.

Singing Hoe Hands Pay Board and Work Gratis

Singing hoe hands who work free and pay their own board have "chopped" 345 acres of cotton for a Motley county, Texas farmer. It all began when Billy Hand unloosed 120 squawking geese in his fields.

"The geese went to work and covered the acreage in a week," says W. C. Pallmayer, county agricultural agent. With the exception of a few large "careless" weeds which geese won't destroy, the field was cleaned—just as if regular hoe hands had done the job.

"One week convinced me," said Hand, "as long as I plant cotton I'll keep geese." His inspiration came after watching three of the fowls "mow" grass on the front lawn.

"The geese work at night when the moon is shining. They stay in the shade of the water wagon when the sun is hot and usually begin work about five o'clock. They seem to be singing all the time," Hand said.

The only cost of running the geese has been 100 pounds of barley each day. The efficiency of the fowls is not limited to their capacity for food, says Pallmeyer. They apparently eat only a small portion of the grass they destroy. They pull it up, leaving it to die in the middles. They attack tall Johnsongrass at the top and cut it to the ground, eating some in the process.

In a few instances the geese nip the cotton, especially around the water wagon, as if they might be appeasing some form of restlessness, notes Hand. No insects were found in the fields where the birds worked—to make geese even more attractive to farmer Hand.

Texas Extension Service

HOW TO GET HIGH FEED EFFICIENCY

Feed efficiency is a measuring stick to show how good a job you are doing with broilers and layers. . .

Condensed from Poultry Tribune

Dr. Homer Patrick

FEED efficiency in poultry is defined as the amount of feed required to produce a dozen eggs or a pound of meat. And since feed costs represent most of the cost of producing eggs or poultry meat, it is important to get high feed efficiency if you are to make a reasonable profit.

There are many factors which influence feed efficiency. It is possible to get poor feed efficiency—even with the best poultry ration.

The highest feed efficiency should be obtained around 60 to 70 degrees F. However, under farm conditions the highest feed efficiency is obtained during the warm summer months instead of during spring and fall periods.

The high mortality during spring, fall, and winter on many broiler farms keeps the feed efficiency down.

Overcrowding of chicks causes higher mortality and many other troubles. Chicks that don't have enough room just don't grow off as fast. And slow-growing chicks can't produce a profit or high feed efficiency as well as fast-growing chicks.

Poor Management Cuts Efficiency

For a good year-round operation of a broiler enterprise one should allow one square foot of floor space per bird. From 2½ to 3 inches of feed space should be allowed when the broilers are 5 to 10 weeks of age. Up to this age allow one inch.

Feed wastage is probably one of the biggest reasons for low feed efficiency on many broiler farms. Since feed is the biggest single cost item of poultry production, wasted feed is wasted profit.

Rats around the poultry farm

Reprinted by permission from Poultry Tribune, Mt. Morris Illinois, August 1954

are hidden enemies of high feed efficiency. To get top feed efficiency have a rat clean up campaign on your farm.

To cut down on feed wastage remember the following rules:

1. **Allow plenty of feeder space.**

2. **Don't fill feeders too full.**

3. **If feeders are home-made be sure they have a "lip" to prevent birds from billing out feed.**

All of the feed companies have a recommended feeding program which is designed to get the best results with their particular feed. Follow the manufacturer's program for best results.

Water is one of the most important and cheapest nutrients. Without an ample supply of good, cool, clean water, good feed efficiency cannot be obtained. Broilers drink approximately 2 pounds of water per pound of feed consumed.

A broiler also produces about one pound of droppings with a moisture content of 72 percent for each pound of feed consumed. At least 7 tons of water must be absorbed by litter or cast off by respiration during the 10 weeks growing period for each 1,000 broilers. This clearly emphasizes the need of good ventilation if the house is to remain dry. Wet broiler houses encourage diseases such as coccidiosis and respiratory infections which in turn increase mortality.

Poor Housing Reduces Efficiency

Poor housing is another enemy of high feed efficiency on far too many poultry farms. Birds that are uncomfortable "get even" with the poultryman by growing slower or producing fewer eggs.

Broiler and laying houses should be built so that maximum ventilation can be furnished during the hot months of the year. Many growers have too much housing. The houses are too tight and birds simply can't get enough ventilation during the extremely hot periods of the year.

Many cases of respiratory troubles can be traced directly to poor ventilation. However, care should be taken to keep down drafts.

Poultry is one of the most efficient convertors of feed into food of any farm animal. But getting the most meat and eggs from every pound of feed is the poultryman's job. It's up to the poultryman to have a management program that will give the birds a chance to give a high feed efficiency.

Farmers Show How to Cut Road Costs

Farmer cooperation makes it possible to have more miles of graveled roads in a rural county . . .

Condensed from Kansas Farmer

Dick Mann

FARMERS in Lincoln county, Kansas, are helping the county save one-third on the cost of graveling roads. This means, of course, more miles of graveled roads can be built with the same amount of money.

Here's the story. About 7 years ago a farmer in the county wanted the road past his farm graveled. He went to the county commissioners and offered to pay for the gravel and haul it himself if they would give him some action.

County commissioners thought the idea over and finally came up with a plan that would help everybody. The county would grade the road, furnish, load and spread the gravel if the farmer would just do the hauling. Other farmers liked this idea and it gradually spread over the county. Considerable country-road mileage has been built by this plan in the last 2 or 3 years.

Gravel can be located in most sections of Lincoln county, and a suitable gravel pit generally can be found within a few miles of the road project. The county pays 15 cents a yard for gravel at the pit. When the county agrees to fill in and level off the gravel pit following use of the pit, the pit owner gets 8 cents a yard.

When gravel has been hauled and dumped on the road by farmers it is spread by the county, which continues to maintain the road and supply new gravel when needed.

A farmer helping to gravel a road can get his driveway graveled at low cost. The county supplies 75 yards of gravel at no charge, and charges 15 cents a yard for gravel in excess of 75 yards. Other farmers have to pay straight 50 cents a yard for driveway gravel purchased from the county.

Many farmers in Lincoln county have cooperated with the board of county commissioners and the county highway department with the result that some 70 miles of county roads have

Reprinted by permission from Kansas Farmer, Topeka, Kansas

been graveled in this manner during the last 6 years. The county estimates it costs on the average of 50 cents a yard to produce the gravel and load it into the farmers' trucks. Farmer road interest is high.

The day we got this story we found 6 farmers hauling gravel for a 3¼-mile stretch running west from a point 2 miles south of Beverly. The road is a connecting link between 2 secondary roads. These 6 farmers, who had hired a 7th man to help haul, started hauling on Tuesday and expected to finish up about noon Saturday. County Commissioner H. T. Schroeder, of Beverly, was assisting by spotting gravel for the truck drivers.

Mr. Schroeder puts it this way: "When farmers haul the gravel it saves the county from $220 a mile on up, depending on the length of haul. For our average road in the county this amounts to a saving of about one-third in the cost of hauling gravel."

Hormone Promotes Cattle Gains

There's a new tool to help America's stockmen increase their cattle feeding efficiency.

The new development is stilbestrol, a synthetic female hormone. Wise Burroughs, Iowa cattle feeding specialist, reported that the best results with the substance have been noted on better rations that contain generous amounts of grain.

Some steers gained three quarters of a pound more per day when stilbestrol was included in their high-corn fattening ration. Cattle being wintered on high-roughage rations gained 10 to 15 per cent more when stilbestrol was incorporated in the ration. Both heifers and steers responded to the substance, but steers showed greater gains.

Total feed costs in the Iowa experiments were reduced 10 to 20 per cent in the stilbestrol-fed groups. Cattle eat only about 5 per cent more when their ration includes the substance, but they apparently can utilize their feed more efficiently.

Feeding stilbestrol in the ration apparently eliminates many of the undesirable "side-effects" of an earlier method, implantation of stilbestrol pellets under the animal's skin. The side-effects included restlessness, "riding", udder development and high tailheads. Also, the new method does not lower carcass quality.

Burroughs said their experiments indicated that meat from stilbestrol-fed steers is free of any residue of the substance. He warned, however, that its use is still in the "early experimental stage."

Iowa State College

HOW TO MAKE DRYING SAFER

Here's a code to lessen the dangers of artifiical crop drying. . .

Condensed from The Michigan Farmer

ARTIFICIAL crop drying on the farm is growing rapidly. Along with its growth has come a greater awareness of the dangers—particularly from fire—of improper or poorly installed equipment. This spring a Michigan Committee on Crop Drying and Safety drew up a safety code giving minimum standards for the selection and use of crop drying equipment.

Here are some of the points in the code. At present only complete drying units made by members of the Crop Drying Manufacturers Association are satisfactory from the standpoint of safety. These units have proper safety control and operating characteristics.

Natural air driers should have a tight housing to separate fan and motor from the crop being dried. Electric motors should have low voltage and overload protection, and gasoline engines an automatic shut-off to avoid overheating of the engine. Proper wiring of the electric motor is important, as is keeping the fan and motor free of chaff and dust.

Portable heated air driers should be a complete unit, as made by the manufacturer. Proper design is important, especially in direct fired units. Heated air driers should not be attached to or used in a large main building, main granary or main storage building. When batch drying on wagons or in bins, the equipment should be 15 feet from the main building. If drying is done in a special building, the drying unit should be connected to the bin by a duct of flameproofed material. For grain driers there need to be controls to shut off the fuel supply in case of ignition or mechanism failure.

Home-built installations are not recommended, because of lack of safety controls, improper design and poor location—unless inspected and approved by the insurance company.

The burner for heated air driers should be an approved type, using the proper fuel and

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with proper controls. There should be an automatic control interlock with fan control which would shut off the fuel supply if the fan stops. Oil drums should be refilled away from the unit, or the unit shut down. The fuel pump and pipe should be outside the drying air stream. The fuel tank should be over 15 feet from the bin and buildings. Most of these safety rules also apply to LP gas and coal.

The use of heated air for drying hay in the barn is not advised. If heated air is used, the hay should be on wagons or in batch drying sheds away from the barn. Not over 15 tons of hay should be put in at a time, and the temperature should be 160 to 180 degrees.

The main points of electric wiring are: bring in the power company to make sure the entrance service box is big enough; have a special circuit wired in for the drier; make sure the connection to the heated air drier is away from main buildings.

In fact, make sure the unit you get is designed for crop drying.

Coarse Grind, Fine Grind, or No Grind?

Been wondering whether you need to grind your livestock feed?

Gus Bohstedt, livestock feeding specialist at Wisconsin, says grinding may not be necessary at times. And there is never any need to grind feed very fine.

Tests show that fine grinding doesn't help palatability or digestibility. Where grain is to be ground at all, Bohstedt says it should be ground medium fine so that it is "gritty or granular" rather than "mealy" when tested between the thumb and forefingers.

Dairy cows need to have both corn and small grains ground to make best use of feed, Bohstedt says. Fattening steers should be fed ground small grains, but may be fed broken ear or shelled corn if hogs follow them in the feed lot. Otherwise, the corn should be ground.

Pigs and brood sows may be fed whole corn, but should have the small grains ground for them. Starting 6 to 8 months after a corn harvest, ear or shelled corn may be so hard and dry that it should also be ground. Lambs that are fattening may be fed either corn or small grains without grinding. Horses and suckling or weaning animals can be fed whole grains, but usually do better if you crack or roll the grain.

Wisconsin Extension

Irrigation Sweeping the Southeast

In an effort to provide soil moisture, Southern farmers are turning to all types of irrigation methods . . .

Condensed from The Southern Planter

J. M. Eleazer

AS irrigation advances to the Eastern Rainfall Belt from the dry lands of the West, we have much to learn. However from experience we are beginning to acquire "know-how" with irrigation here in the East and Southeast.

In South Carolina, there is some irrigation in every county now, and I have yet to see a farmer who does not like it. Increased yields of everything from pastures to peaches, and from cotton to cucumbers have resulted. In fact, many increases have been phenomenal.

The sprinkler type of irrigation is by far the most prevalent in this area. But we do have instances where furrow or gravity irrigation is practical and is practiced. Farm ponds are being built by the thousands. Below each is usually some arable land that can be reached by gravity. Olin Helms of Lancaster, South Carolina, has solved his problem with a piece of 3-inch plastic pipe as a siphon across his dam. The water is then carried by contour ditches to the rows, where it is guided with no other equipment but a shovel.

Where underground water is to be found in sufficient volume, wells are being put down. We have one 12-inch well that has pumped 1,850 gallons per minute for 50 hours without diminishing. And we have reasons to believe wells like that are possible at other places.

At many locations farmers are digging large reservoirs in low places, where seepage water gives them a goodly source of irrigation water. Dry-land ponds too are catching much of the normal run-off after rains.

For sandy lands that take wa-

Reprinted by permission from The Southern Planter, Richmond, Virginia, April 1954

ter fast, Walter Rawl of Lexington County has made something that he uses very successfully instead of the usual sprinkler head. He threaded 6-inch pieces on inch pipe and plugged up the other end. He then bored 6 three-sixteenths inch holes through it near the plugged top. These are then screwed in the sprinkler holes in the portable pipe. The water fans out from these, reaching a row of peach trees on each side. His lands are sandy and no run-off was secured there where he was putting an inch of water on in about a half hour.

This method of irrigation has several advantages. First, it throws the water very low, getting very little of it on the foliage to wash the spray material off and induce bacterial and fungus growth. It requires a lot less pressure on the line. And these pieces of pipe are very durable, cost little, and don't stop up nor have to be handled as carefully as sprinklers do. For land that will take water fast, they look mighty good to all who have seen them work.

New Tax Advantage For Conservation

Under a provision in the Internal Revenue Code of 1954 (Public Law 591, 83rd Congress), farmers making out income tax returns this year may treat as current expenses costs they incur for carrying out certain soil and water conservation measures.

The costs must be in connection with land actually used in farming. They are described in the law as "expenditures paid or incurred for the treatment or moving of earth, including (but not limited to) leveling, grading and terracing, contour furrowing, the construction, control, and protection of diversion channels, drainage ditches, earthen dams, watercourses, outlets, and ponds, the eradication of brush, and the planting of windbreaks."

Not included as deductible expenditures are "the purchase, construction, installation, or improvement of structures, appliances, or facilities which are . . . subject to the allowance for depreciation." On the other hand, assessments by a soil or water conservation or drainage district to accomplish measures which would be treated as current expenses if performed by the taxpayer himself may be listed as a current expense.

In no one year can more than 25 per cent of gross income from farming be listed as a current expense for conservation costs. If actual expenditures exceed this limit in any one year, the excess may be listed in succeeding years in order of time.

West Virginia Extension

THEY GET MORE PORK PER SOW

The farm scales work overtime for this Kansas farmer. They're used to wean pigs, pick gilts, and cull boars and sows. . .

Condensed from Farm Journal

Ovid Bay

ARNOLD Rose believes in weaning pigs by the scales, rather than the calendar.

About once a week Arnold and his son-partner, Bob, pull a trailer past the pens where sows have pigs getting up to 30 pounds. Each pig is weighed. Those over 30 pounds are tossed into the trailer for a ride to the weaning pen. The rest stay put for another weighing and sorting.

"Just a few more days on the sow is the best medicine we've found for pigs that are a little behind," explains young Bob. "It sure evens up the bunch in a hurry. While the pigs start eating in creeps when they're a week to 10 days old, that extra shot of sow's milk for part of the litter really gets 'em going."

That's just one practice that's made this 220-acre Jewell County, Kan., farm one of the top hog plants in the area. Incidentally, they raised 849 pigs last spring from 96 sows. That's an average of 8.8 per litter.

Each litter being considered for replacement gilts is weighed when the pigs are two weeks old. If a gilt's litter weigh less than 65 pounds or a sow's less than 85 pounds, Arnold saves no gilts from that litter. That's the rule for spring litters. He lowers that five pounds for fall litters.

Explains Arnold: "We believe that milking ability is very closely tied in with the 14-day weight of the litter. So we want them heavy. Naturally we want enough nipple spots, good disposition, and a good meat type.

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania, August 1954

But those pigs **have to come up to weight,** or they're out of the picture." He had a dozen litters last spring that went over 100 pounds at the two-week weighing.

He didn't just pick that 14-day weight out of a hat. He started weighing hogs at 56-days several years ago. That didn't quite satisfy him. So he started weighing at different ages, until by 1952 he was weighing at two, three, four, six, and eight weeks.

That was a lot of work, but it paid off in that he found that litters that were heaviest at two weeks were almost always at the top at eight weeks. And it's a lot easier to heft a 14-day pig than one that's 56 days old.

Culling continues as long as a sow or gilt is on the farm. Records are checked after each weaning. The standards are tough enough so that only 41 of the 96 sows farrowing this spring are being kept for fall litters. They were good, but not quite good enough. On the other hand, a few sows will farrow their eighth litters this fall.

Arnold buys the best meat-type boars he can find. But he doesn't trust his eye alone. He tries each new boar on a few sows. If he gets a uniform pig crop of the type they want, he stays on the farm and is put to work on the next crop. If not, the pig goes to market.

Arnold started this practice in 1947, and he strongly believes it's the only sure way of telling just what a boar will do in a herd. When he gets a pig he likes, he keeps him around for awhile. He used but three different boars from 1950 through 1953, and has two four-year-old boars in use on the farm now.

The breeding stock is thoroughly cross-bred. He has used the following boars in rotation: purebred Hampshires, purebred Berkshire, Minnesota No. 1 and No. 2, and Beltsvilles.

But even with this scrambling of breeds, Rose has kept close to some of his original parent stock. All but three of the 96 sows that farrowed last spring trace back to a cross-bred sow that he bought when he started in the hog business in 1944. She raised several 500-pound litters for him when he was using the 56-day weaning weights as the basis for picking breeding stock.

Sows and gilts are pasture bred. "We've averaged one to one and a half more pigs per litter since we started," says Arnold. "Big thing is that we've gotten away entirely from the occasional three-pig litters we used to get. We watch the sows and pen them as soon as they look close." (Experiment Stations report an extra pig per litter when sows are bred more than once during a heat period.)

Both Arnold and Bob are sold on meat hogs. They're sat-

isfied that they make their gains on less feed. Also, they can put on up to 50 extra pounds and still get a market premium. "That's 40,000 more pounds of pork we can sell twice a year," points out Arnold, "with no extra sow cost, vaccination, litter care and so on. We have probed live hogs up to 250 pounds and find no more than 1.25 inches of backfat."

All feed is ground and mixed right on the farm. Milo is the main fattening grain. It is bought at harvest, when prices are usually lowest, and stored on the farm. Protein and antibiotic-vitamin supplements are bought in bulk. Spring pigs are fed out on alfalfa, rye and sudan pastures. Fall pigs are finished in a dry lot with a shed open to the south for weather protection.

If You Are Thinking of Buying A Farm—

Young men purchasing farms should have their personal property, including a good line of tools and at least some livestock, all **free of debt** plus **at least** one third of the price of the farm they consider buying. Also some **cash** to operate on and make a crop before any income is expected.

It is better to rent a good productive farm with a nice set of buildings than to buy before you are ready financially and be so hard up you become grouchy and do a slip-shod job of farming. Too many young families get in too big a hurry to be land owners and often find themselves out on a limb with no ladder handy.

Do-Well Newsletter

Youth Saves Livestock

Alan Campbell, a member of the Future Farmers of America, won the 1954 national Humane Act Award of the American Veterinary Medical Association for conducting a single-handed campaign against the practice of chaining cows at calving time.

The youth became concerned over the spectacle of new-born calves, injured or dying of neglect, out of reach of the tethered cow. Alan advocates maternity pens in which cows are confined but not chained prior to calving. A farm-to-farm canvass in his home area showed that less than one-fourth of the dairy farmers used such pens. So Alan set out to correct matters himself. He made "The Curse of the Chain" his subject for an F.F.A. speaking contest, and won state and regional honors.

Livestock Conservation News

Algae: Microscopic Crop of the Future?

Green algae offer prospect of cheap livestock feed and lower sewage-disposal costs. . .

Condensed from Farm Management

THE simplest of all plants—one-celled green algae—may become the plant of the future.

For years, gloomy prophets have warned that relatives of the green scum which everyone has seen on stagnant water offer the only hope of feeding the vast human population they see in the future.

But a more immediate prospect of using green algae has come from the University of California's sanitary engineering laboratory at Richmond. Scientists there believe that growing green alage on sewage-disposal ponds offers practical possibilities for a double-barreled program: producing a concentrated livestock food and helping dispose of human wastes.

Ranging in size from single-cell organisms to large seaweeds, the algae are possibly the most efficient of all plants in using the energy of the sun to convert minerals into the organic molecules that make up the cells of plants and the essential food of animal life.

Algae are increasingly in the spotlight as a remarkable source of protein and other essential minerals, and already have been produced in test plants. But in most of the work to date, nutrients such as nitrogen have to be supplied at relatively high cost. When algae grow in sewage, they get their nutrients from a material which otherwise would be wasted.

High in Protein

With sunlight, the algae rapidly produce large amounts of animal nutrients. Algae growing on a sewage pond in midsummer will contain 50% crude protein, 20% carbohydrates, 15% fat and 15% ash. No data is available at present on the total digestible nutrients, but these figures indicate the TDN is easily in excess of 50%.

But the algae can't feed directly on the sewage. Bacteria form an essential part of the pro-

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cess, breaking down complex animal and vegetable matter into the simple elements and compounds which the algae can build into new complex materials.

Bacterial action is a major element in sewage purification, but putting the bacteria to work is an expensive process, requiring elaborate systems and disposal plants. In one single major project, $43 million was spent to safeguard the beaches of Santa Monica, Calif.

And the problem is growing with our population. To take a single area, about 200 million gallons of sewage a day is now flowing through the sewers of the San Francisco bay area. A 50% increase, to 300 million gallons daily, is expected by 1980. By that time, it is estimated that the national population will be 193 million, producing about 7 trillion gallons of sewage annually. Within the next 20 years, according to one estimate, $10 billion will be spent on sewage disposal systems.

Valuable Tool

If algae can be put to work in the disposal process, they will produce a substantial economic return as well as reduce the cost of building and operating sewage disposal plants.

And those are not the only possible benefits. Population pressures, we are told, "will make wheat fields and cattle ranges luxuries of the dear, dead past." Feeding man's 40-ounce stomach will be a race between growing populations and man's ingenuity. This algae-sewage process could be a valuable aid if the race gets close.

The algae-sewage process isn't a wild scramble to solve the protein shortage, but a promising practical means of making use of important waste nutrients. Algae contain chlorophyl which enables them to trap solar energy for photosynthesis. This is the chemical reaction in which carbohydrates are produced from carbon dioxide, water and minerals by living plant cells in the presence of light.

The farmer who takes manure from the barn and spreads it on fields to make plant food is starting exactly the same process. The reactions are the same; the difference is in the speed of conversion.

At Richmond, this process is already being conducted on a pilot scale in an outdoor trough called an oxidation pond. Even on such a small scale, daily conversion is substantial. Based on preliminary results, the scientists estimate that as much as 1,000 pounds of bone-dry pastuerized algae may be produced per million gallons of sewage a day.

Great Potential

Multiply this estimate by the

billions of gallons of sewage being treated in disposal plants, and the answer is a stockpile of algae crops that could fill the protein requirements of a large share of the earth's animal population. And the difference in land requirements is astounding. Compared to the national average wheat yield of about 900 pounds per acre, the green algae may yield as much as 35 tons per acre per year—and with a higher nutrient content.

The unique experiment of algae-sewage food conversion began in 1949 when three California engineers began to study the treatment of sewage by utilizing algae to supply oxygen. Providing oxygen for bacterial action is a big problem in sewage disposal systems. Algae, like other plants, release oxygen as a part of their life processes.

Three engineers, Prof. Harold B. Gotaas, director of the laboratory, Harvey Ludwig, now with the U. S. Public Health Service, and William J. Oswald, research engineer, found that algae not only produced more oxygen than the bacteria needed, but also produced large amounts of a food material which bore no resemblance to the original material.

Fast and Simple

This fantastically fast and simple cycle suggested a greater potential than they had expected from the use of algae. As Oswald points out, "If you take fresh steer manure and put it on the land, it will be perhaps three months before it becomes good fertilizer. If one planted wheat on this fertilized soil, it will take three months to mature. Give a sheaf of wheat to a cow and one day later you finally get milk. Now look at the algae process where the entire cycle takes less than a week. Food eaten today would be sewage tomorrow, algae in two days, and if fed to a cow, milk in another day."

Part of the research work centers around selecting species of algae which will do the best job under these circumstances. Some of them actually prefer to grow in polluted waters like sewage. Temperature requirements are another major factor.

The experiments are conducted in specially designed culture tubes where the algae work in a vital partnership with aerobic bacteria. In this intimate association, or symbiosis, the bacteria break down the complex organic matter of the sewage by oxidation, producing carbon dioxide, ammonia (nitrogen) and the several essential minerals. The algae, in turn, take water, carbon dioxide, nitrogen and the other elements to build their own body cells, and give off oxygen. This oxygen is used by

the bacteria in breaking down more sewage.

Its a cat-and-rat farm with a firm scientific foundation.

Young and Tender

One interesting finding in the lab tests is that the process works best when it works fast. With temperatures and lighting kept constant and high rates of sewage application, the algae cells are young, multiply vigorously and synthesize large quantities of oxygen and cell material. If they are kept on lower rates of sewage application, or for longer periods, the cells become yellow, fat and large, and tend to decompose into odorous masses.

The algae are separated from the solution by a centrifuge similar to a cream separator. They come out as a dark green liquid, which can be spray-dried like powdered milk into a flaky powder. It is, in fact, edible for humans; the flavor doesn't appeal to the average human pallate, but is not objectionable.

In the oxidation pond a few steps away from the laboratory, the process is being carried out on a larger scale. The pond, 80 feet long, is low in cost and requires little labor for operation. Oxidation ponds of this type represent a substantial saving over present types of installation required for the oxidation process in the second stage of sewage disposal.

One of the savings is in space requirements, an i m p o r t a n t item in metropolitan areas. Present methods of municipal sewage disposal take about 35 acres to handle a million gallons of sewage a day. The algae farm probably will handle the same amount on only six acres.

A faucet at one end of the pond brings a flow of settled sewage from which the large pieces of organic matter have been removed. As the sewage enters the shallow basin, bacteria are already at work breaking up the dissolved organic matter. Algae grow rapidly in this flood of plant nutrients.

A second valve p o u r s the purified sewage, now practically odorless, into nearby San Francisco bay. A third valve takes off the liquid containing the algae into a separator where they are continuously concentrated. The concentrate goes into a separate container to be dried.

Dried and sterilized, this algae feed has been safely and enthusiastically eaten by cats, dogs and chickens. Mixed with three parts of bran it still contains as much protein as the average commercial feed.

Algae may also serve as a new source of fuels, according to another recent report. Dr. R. L. Meier of the University of Chicago reports that it is technically

possible to produce methane by fermenting algae.

Costs not Checked

And yet, no extensive studies have been made to determine costs of a commercial operation of an algae-sewage plant, but there is every reason to suppose that it is practical, particularly in view of the high cost of disposing of sewage.

Dr. Gotaas says, "There appears to be no reason why the valuable organic nitrogen contained in settled sewage cannot be commercially reclaimed in the form of high protein algae and thus employed, say, for cattle, following its sterilization."

And Harvey Ludwig adds, "'Sewage to beefsteak' may be a real economic possibility."

How soon the development may come depends on economic pressures, but the "algae farm" looms as a distinct possibility. And one of the most remarkable things about it is that it is the food-producing process which can respond in direct proportion to any increase in population.

Kill Stumps With Chemical

Still bothered with those old stumps shooting out suckers, or has that brush you cut a while ago come back to haunt you?

It's one of those cases where cutting a tree or some brush doesn't end your worry—but there is a remedy, says B. H. Grigsby, Michigan plant physiologist.

The remedy is chemicals, and they can be used in winter. Woody vegetation can be killed by foliage sprays, bark sprays or by treating the cut stumps. There are two recommended sprays: One is a mixture of 2,4-D and 2,4,5-T esters. Another is 2,4,5-T in fuel oil. From 2 to 4 quarts per 10 gallons of oil is a good mixture.

On uncut trees, the lower 12 inches of trunk and any exposed roots should be sprayed until you can see some run-off. Trees with thick bark should be partly girdled to allow the chemical to penetrate.

Cut stumps can be treated with the same solution as used for bark spraying. It gives good results on even large trees and those difficult to kill by other methods. The bark and outer 2 or 3 inches of the cut surface of the stump should be sprayed to the runoff point.

Bark and stump treatments may be made at any season, but best results are received from early spring applications.

Michigan State College

DON'T LET RATS STEAL YOUR PROFITS

New Rat-Killer Works Successfully on an Entirely New Principle . . .

R. C. Dobson, Entomologist

EVERY rat on your farm eats 20 pounds of food a year. Besides, each one destroys or dirties an equivalent amount.

For every rat you see, there are 12 you don't. Each female has an average of more than three pregnancies a year with almost nine off-spring in each litter. The average life expectancy of a female rat is two and a half years.

Put all those facts together, and you can figure out that, if each rat survived, there would be about 221 young rats for every rat you see on your farm. Fortunately, all the little rats don't grow up, but if even half the little ones survive, a tremendous rat population can build up on your place

The rat population of the United States is about 100,000,000. Some 50,000,000 of these are found on farms, with the rest in cities and towns. This means that there are five rats to each person on a farm. There are two rats per person in towns, and only one rat to every five people in cities.

The size of rat populations depends on the amount of food available, the number of hiding places, and the rate of mortality. Although sanitation and the use of structural methods will reduce the number of rats around a farm or place of business, the best method of controlling rats is by the use of rodenticides or rat-killing poisons.

Probably the best rat-killer that has been developed for farm or home use is warfarin. This recently-developed material does its work on an entirely new principle. When taken into the stomach of a rat, warfarin attacks the small capillaries lining the stomach wall. These are broken down, and the blood loses its ability to coagulate. The rat then bleeds internally and finally dies. In other words, the poisoned rats get bleeding ulcers and bleed to death.

Reprinted by permission of the New Mexico Extension News

Warfarin is especially good as a rat poison because unlike other rodenticides, it is odorless, colorless, and tasteless, and rats do not shun it. This material does not kill the rats immediately, so the wise old rats can't connect the poison with the sudden death of their relatives. The rats will go back to the baits time and again until they have gradually eaten enough to kill themselves. If taken accidentally, the poison will not cause serious injury to human beings, dogs, or cats.

The action of warfarin is relatively slow, and bait stations must be maintained for several weeks to be sure that the rats are all gone. During the fall of the year, it's advisable to maintain these bait stations to kill any migrating rats that might move in.

Barley Proved Valuable Pig Feed

"Thin" barley kernels that malting companies cannot use are almost as valuable as plump kernels when used as hog feed.

A University of Minnesota feeding experiment described by Prof. L. B. Hanson found thin barley was worth $1.01 per bushel for pigs from 40 to 125 pounds and 90c a bushel for pigs from 125 to 200 pounds. Corn's value was fixed at $1.35 a bushel for comparison.

Plump barley kernels, which bring as much as 50 per cent premium over thin kernels, were only 6c more valuable than thin kernels for growing pigs from 40 to 125 pounds and 18c a bushel more valuable in fattening pigs from 125 to 200 pounds.

Feed requirements per pound of gain were least for a corn-fed group and highest for the thin barley-fed group. Virgin and plump barley were equally efficient in producing gains on pigs under 125 pounds. From 125 to 200 pounds, plump barley was slightly more efficient.

In terms of feed efficiency, corn was worth 10.7 per cent more than plump barley for hogs up to 125 pounds, 8 per cent more from 125 to 200 pounds. For the entire feeding period, corn was considered 9 per cent more efficient than plump barley.

Market price of barley when the experiment began was $1.55 a bushel for virgin, 96c for thin and $1.65 for plump barley. Government acreage restrictions for the 1954 corn crop encouraged a large increase of barley. The experiment was designed to see how valuable barley can be as a hog feed.

University Farm News

Fog Fire Fighting

This new method offers great promise for the control of fires, particularly those in rural sections . . .

Condensed from Nebraska Farmer

C. L. Hamilton

IN the last decade the most important development in the science of fire fighting is using water in the form of a fine mist. In this form, water has an enormous capacity for absorbing heat and quenching fires.

This permits tremendous savings in the amount of water required and the resulting water damage. The misty fog also protects firemen from heat, smoke or gases, simplifying quick entry and close-range operation. When equipped and trained to use fog fighting techniques, most rural fire districts will multiply their effectiveness many fold.

Fog fire fighting equipment, plus a new product, a "wetting agent," added to the water, will undoubtedly replace most of the old conventional type equipment for rural fire fighting. With this new method 500 gallons of water or less is all that is required for about 75 percent of the rural fires. This makes it practical for fog equipment to carry its own water supply for most farm fire runs. An auxiliary tank truck or other means can be provided economically, to supply the additional water that may be needed for a few of the larger farm fires.

With conventional equipment using a solid stream of water, 5,000-6,000 gallons or about ten times as much water was generally required for ordinary farm fires.

Heretofore inadequate water supply has always limited the effectiveness of rural fire fighting districts. Hydrants with unlimited water were not available on farms as in cities. Special concrete cisterns and ponds were recommended as alternatives in rural areas, but these large man-made water storages were expensive and only a comparatively few were ever installed. Only a

Reprinted by permission from Nebraska Farmer, Lincoln, Nebraska, May 1, 1954

few fortunate farmers had a natural lake or stream in their backyards. Under these conditions equipment and fire fighting methods developed for cities were handicapped and unsuitable for rural areas.

Fog Equipment

Earlier rural fire districts naturally attempted to adapt city methods and equipment to rural needs because they had no other choice. Some rural districts were advised to purchase conventional pumpers which experience has proven unsuited to rural fire fighting requirements.

It is only recently that fire chiefs and other fire fighting authorities or producers of equipment, have fully recognized the differences between rural and urban fire fighting needs. The limited funds for equipment in most rural districts can soon be dissipated through unwise selections and purchases.

Water fog and spray nozzles in fire service are about as old as fire fighting itself. Their merits and effective nozzle designs or applications, however, remained undiscovered until World War II. Subsequently water fog became one of the most controversial subjects connected with fire fighting.

Claims and counter claims, assertions, and denials echoed and re-echoed throughout the country. Traditions and misbeliefs in the need for large volumes of water in fire fighting, made many reluctant to acknowledge the advantages of fog. While there is still some controversy over the relative merits of high pressure and low pressure fog, today most authorities are now unanimous in their support and acceptance of the fog principle.

How It Works

To thoroughly appreciate the effectiveness of fog for extinguishing fires you must understand the action of water on fires. Water extinguishes fire by absorbing heat and reducing the temperature of the fuel below the ignition point. When water is poured on a fire in large volumes or in a solid stream, it quickly flows off to a lower level and often does damage on the way. The limited surface exposed and the short time the water is in contact with the fire, does not allow it to absorb more than a fraction of the heat that it is really capable of absorbing. Most of the extinguishing agent is actually wasted.

When held in contact with the fire, water will absorb heat right up to and even after it has turned to steam. It absorbs nearly six times as much at the moment it is turning into steam, than it does in being heated to the boiling point. It is obvious therefore that water has not approached its maximum efficiency in fire extinguishment until it has turned to steam.

The rate or speed at which water will absorb heat is direct-

ly proportional to the water surface exposed to the heat it is to absorb. By breaking the water up in very small particles, a much larger water surface is exposed to the heat of a fire. The smaller the particles of water the larger the surface area exposed. Each of these little particles absorbs heat and turns to steam much more rapidly than it could if it were part of a solid body of water and the cooling action is distributed over a wider area.

This is the reason why fog extinguishes fire so effectively with a relatively small amount of water and with very little water damage or waste. Less water is needed in the first place to obtain the same amount of cooling, a larger area is cooled at one time, and finally a much greater percentage of the water is dissipated in the air as steam. Any method of applying water, that increases rate of heat absorption during the time it is in contact with the fire, will increase its fire extinguishing efficiency.

When water turns to steam it has absorbed close to its maximum heat, but its usefulness in extinguishing fire has not ended. Steam itself is an effective extinguishing agent. When water turns to steam, it expands 1,700 times. This rapid expansion tends to displace oxygen in the atmosphere and produces a blanketing or smothering effect on the fire.

With further research and investigations, the advantages of water fog over a solid stream may continue to multiply. New nozzle designs or new application techniques, may uncover additional ways of increasing the efficiency of fog as a fire extinguisher. Already it has proven its effectiveness and it is undoubtedly destined to play a major, if not a leading role in fire fighting practices of the future.

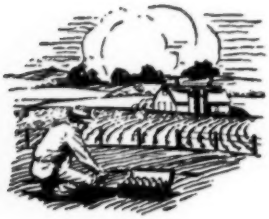
More Butter Being Used

Lower retail prices have led to increased butter consumption by householders according to estimates recently published by the United States Department of Agriculture. Purchases of butter for household use were estimated at 58.5 million pounds in May, up about half a million pounds from April, and four-and-a-half million pounds more than average monthly purchases between last November and January of this year.

Householders reported paying 66 cents a pound for butter in May, a little less than the April price level but 10 cents a pound below the November 1953 to January 1954 average.

Missouri Extension

Quality in a Small Package



Following sound soil conservation practices, and being receptive to new ideas, this New Mexico farmer has made an outstanding success . . .

Condensed from Western Farm Life

Walter W. Martin

IT ISN'T the biggest, and it to begin with it certainly wasn't the best farm in the San Juan basin. Nevertheless, the 80-acre farm of Rudy Ferreri about a mile west of Bloomfield, N. Mex., is one of the most attractive and most productive in the area. How it got that way involved no magic formula—just progressive hard work.

The year was 1932, and the 40-acre tract had not previously been cultivated. "It was one of the last places left around here—probably because nobody wanted it," Ferreri recalls. "We had to stay—you couldn't go anywhere in 1932. If it hadn't been for the help of my wife's parents, who live next door, we'd never have made it."

Won Banker's Award

The Ferreris have done much more than just cling to the soil for two decades. Last September, when New Mexico was observing Soil Conservation Month, the state bankers' association singled out 133 of the state's 23,000 farmers and ranchers to honor for their conservation efforts. Rudy Ferreri was among those who received that citation.

Considering just work done in cooperation with the San Juan soil conservation district, the awards committee noted that on 80 acres (the original 40 plus another 40 across the road pur-

Reprinted by permission from Western Farm Life, Denver, Colorado, July 15, 1954

chased in 1945) Ferreri had leveled 23½ acres, erected small irrigation structures, constructed 300 feet of stream-bank protection and 210 feet of closed drain and carried on a crop rotation. Among other things, that does not include leveling the original 40 acres and filling two arroyos by horsepower.

The rotation has been responsible for building up the soil more than 20-fold, as measured in bean yields. The first year the farm produced about 100 sacks of pinto beans to the acre; in recent years the average has been 2200-2500 sacks on the same land.

Hay and Bean Rotation

The rotation requires eight years to complete the cycle and provides cash crops five of the eight years. Ferreri starts with fall wheat, into which alfalfa—New Mexico or Colorado Common—is sowed the next spring. Thus he provides a cash crop while the hay is getting established. The hay is left three more years, then is turned under and is followed by four years of beans.

The hay production, averaging 6½ to seven ton per season, fits into the livestock side of the farming program while the land is being built up for beans. An adjoining 140 acres, nearly all of which is in pasture, is leased for cattle. A $3,000 hay shed stands as evidence that he believes in turning out unweathered hay high in vitamin A.

Along with building up the soil, Ferreri has been willing to spend money and effort for good seed beans. The disposition to try what is new and take on new ideas that work is probably what sets this family and its farm apart from the average. The seed beans are an example.

Approves Seed Treatment

Three years ago Ferreri saw a new Idaho pinto at Grand Junction, Colo., and he went back to order certified seed which was planted for the first time last season. It made 2100 bags to the acre and matured in 75 days from a June 15 planting.

Seed beans from the Dove Creek, Colo., area are commonly used in northwestern New Mexico. Ferreri found that they go to vine late in the season, while the Idaho variety stands up straight. The heavy top growth of the Colorado beans obstructs irrigation water and makes it difficult to see the water in the row.

Ferreri has never had any trouble with mosaic, although it is invading parts of the basin. The rotation program and seed treatment are the reasons, he believes. Although many of his neighbors don't treat their bean seed, Ferreri uses Spergon and believes it helps.

He has not been afraid to differ with his neighbors on practices he thinks are worth while. He was one of the first to use phosphate fertilizer on his alfalfa, at a time when it was generally believed phosphate would ruin the land. Ferreri finds it increases yield.

Another fertilizer experiment which is working is nitrogen on corn. It takes a lot, he finds, but the yield was more than 100 bushels to the acre in 1952. Only five or 10 acres of U. S. 13 variety are grown for cattle and hog feed. The nitrogen-stimulated corn last season was so tall a man couldn't reach the ears and even the suckers had ears six to eight inches long!

The principal crops are supplemented by an orchard, garden and vineyard for family use. The two-year-old house has a large basement storage room which gives evidence of their production. A less common enterprise is production of their own wine.

The Ferreri farm is a show place. As County Extension Agent Austin Albert describes it, "You can't possibly miss it. It's the most attractive place on the road." More than that, it is concrete evidence that farming can be a pleasant and profitable way of life, even in a community caught up with the fever and high wages of a booming new natural gas industry.

Now, Predict Your Young Cow's Future

A new U. S. Department of Agriculture method gives farmers a way to predict closely the future milk output of young dairy cows. They can do it by multiplying her early production by certain "age conversion factors."

The method can help dairymen decide if a heifer is worth keeping as a milch cow. It can also furnish a means for an early check of her sire's value as a breeding animal.

The conversion factors are arranged in tables for easy use. Scientists have used the tables for years in the national Dairy Herd Improvement Association's sire-proving program. Tables were improved last year for better accuracy.

The revised factors are based on a study of 305-day milking records of nearly 600,000 cows. They were all ages and milked twice a day. Records covered the years 1945 through 1952.

Tables of conversion factors can be obtained from the Dairy Husbandry Research Branch, U. S. Department of Agriculture, Washington 25, D. C.

New Uses of Farm Products Through Research

Wider uses are found for many farm products through the intensive research program in the U.S. Department of Agriculture . . .

Condensed from The Agricultural Situation

G. E. Hilbert

THE problem of surpluses in various agricultural commodities has been a recurring one in this country for many years. The unusual domestic and foreign demand for our farm products during World War II and the Korean conflict temporarily turned our surpluses into shortages, but we have again gone into a period of transition—of adjustment from wartime demands to peacetime markets.

Many positive actions on prices, production controls, markets, and other problems are being taken to make this adjustment easier. Such actions are desirable—even necessary—to get our economy back into balance; but for the **long-term approach,** agricultural research can provide the best answers.

Through our utilization research, in the U. S. Department of Agriculture, we are constantly searching for new and expanded uses for farm products.

Two Kinds of Surpluses

There are two types of surpluses: **seasonal** surpluses of **perishable** commodities and **annual** surpluses of **stable** commodities.

USDA research on the perishable commodities—milk, eggs, and most of the fruits and vegetables—has been directed toward development of methods for converting them to a permanently stable, palatable, convenient-to-use form so that they are preserved and made available throughout the year. This conversion to a year-round product also tends to stabilize the prices of these commodities.

An excellent example of the soundness of this approach is found in the citrus industry. At the end of World War II, the industry was deeply concerned

Reprinted from The Agricultural Situation, Washington, D. C., June 1954

with possible serious orange surpluses. There were even discussions on the possible need for Government price supports.

Then frozen concentrated orange juice was introduced to the public. The basic work on this product had been done through a cooperative undertaking of the Florida Citrus Commission and the USDA. Because the product can be stored for more than a year, is convenient to use, and has practically the same flavor and quality as fresh juice, it was widely accepted by consumers. The industry has mushroomed during the past several years, and the expanded production of oranges has been absorbed without difficulty. This development has thus prevented a serious surplus problem.

Frozen concentrated lemon, tangerine, grapefruit, grape, and apple juices are now on the market.

Fruit and vegetable juices also can be converted into another form—powder. Orange, lemon, apple, prune, grape, and tomato powders of excellent palatability have been developed. The powdered juice can be stored on the kitchen shelf and can be reconstituted quickly by the addition of water—even ice water.

Progress has been made in research to develop new methods of preserving fruits and vegetables. Two of these are **dehydro-freezing** and **dehydro-canning.** In these processes, the commodities are partially dried and then preserved indefinitely by either freezing or canning. Both types of products can be reconstituted quickly by immersion in water. Here, as in the processing of juice to powder, the cost of processing is greater but the savings in transportation and storage are appreciable.

Research likewise has led to the production of high-quality potato dice and granules which can be quickly and conveniently converted to mashed potatoes in the kitchen. They may go a long way in alleviating the problem of seasonal surpluses of potatoes.

Preservation of eggs by freezing has been practiced widely and is helping to stabilize the market. Powdered eggs that can be stored and still be as palatable as fresh eggs have developed since the war. USDA research found that the sugar glucose in the egg causes the development of off-flavors. By destroying the glucose either by yeast, fermentation or by enzyme treatment, eggs now can be safely stored for more than 6 months at 100° F.

The present surplus of dairy products is well known. However, excellent progress has been made in producing favorable food products from skim milk long used as feed. This will permit the sale of butter at a

price more competitive with that of other edible fat spreads. For if skim milk, long a by-product in the creamery areas, gets to be a regular product bringing in cash, farmers may be less dependent on butter for maximum returns.

Advances also are being made in developing stable and palatable forms of whole milk concentrate, or powder, which can do for the dairy industry what frozen concentrates have done for the orange grower.

Motor Fuels and Antibodies From Grain

Of the non-perishable or storable commodities, wheat, corn, cotton, and inedible animal fats pose the most serious problems.

During the past 50 years, the annual per capita consumption of wheat has dropped from 230 pounds to about 140 pounds. One of the factors contributing to this decrease is changing food habits. Another is believed to be the rapid aging or staling of bakery goods. One approach to the staling problem involves the freezing of bread and bakery goods. USDA research has been concerned, too, with the use of bread softeners—certain fat derivatives and proteins—to prevent staling.

Considerable progress has been made in developing methods for determining milling and baking characteristics of new strains of wheat. These methods require only a few kernels of wheat for testing and would expedite the introduction of new and more desirable high quality wheats. They are particularly advantageous in enabling us to compete more favorably in the export market.

Significant contributions have been made in developing new outlets for corn, particularly new fermentation methods developed for producing vitamin B^{12} and antibiotics for use in poultry feeds.

The greatest potential market for grains is in motor fuels. High support levels on wheat and corn put alcohol made from these products in unfavorable competition with synthetic alcohol, but the problem is largely one of policy and legislation.

Special Uses For Cotton

One of our big surpluses is in cotton. During the past several years cotton has felt keenly the increasing competition of man-made fibers, particularly industrial utilization.

An intensive research program is underway to improve the properties of cotton through chemical treatment and modification; in brief, to tailor-make cotton fibers for special use. One of these fibers, acetylated cotton, has higher heat resistance than either natural cotton or synthetic fibers and is being used for commercial and home laundry ironing board covers. It also has marked resistance to biologi-

cal attack and sunlight. Better flameproof cotton fabric using the chemical, THPC, is another example of chemical treatment. Actually, hundreds of tailormade fibers can be produced from cotton by treatment with chemicals.

Improved types of equipment for processing cotton have been developed. One is a new type of cotton opener which fluffs up the fibers and makes them easier to clean. These openers are saving a dollar per bale in processing costs. New instruments have been developed for measuring the properties of cotton fibers to determine their best end usage. A new dye technique for distinguishing between immature and mature fibers is helping industry pin-point processing problems.

Since the end of World War II, production of oils and fats in this country has increased 50 percent, while consumption has increased only 11 percent. The decrease in use of fats in the manufacture of soaps, because of synthetic detergents, has been largely responsible for the present surplus.

In the food field, it is not likely that research would increase consumption of fats. Outlets must be found mostly in the **feed** and **industrial** field. New markets for inedible fats have been developed in the chemical industry, in the plastic field where they are used as plasticizers, and in the **hot-dip** tinning of steel where they are replacing imported palm oil. Soaps made from fats are used as emulsifiers in the manufacture of synthetic rubber.

The largest potential new use found for inedible animal fats is in feeds. As a result of USDA research which showed that certain nontoxic antioxidants would stabilize the fat without undesirable effects, the use of inedible fats in the feed industry is expanding rapidly.

The agricultural revolution that has taken place in this country during the last 40 years had its beginning in research in the physical, biochemical, and engineering sciences and the application of these research results on the farm. Research has shown us **how to produce** abundantly. It also is showing us **how to use this** abundance efficiently.

Taxes on Farm Real Estate

Taxes on Missouri farm real estate have increased four fold in less than half a century. According to the United States Department of Agriculture figures, the amount of taxes levied on farm real estate in 1953 was 81 cents compared to 21 cents in the earlier period from 1909-13.

How They Do It In Texas

4-H'ers in Howard County, Texas, utilize sound practices in reaping Grand Championship results at some of America's leading Fat Steer Shows . . .

Condensed from The Hereford Journal

Durward Lewter, County Agricultural Agent

SEVERAL factors contribute to the success of the 4-H club steer feeding program in Texas' Howard County. These include the support of local Junior Chamber of Commerce, civic clubs, businessmen, farmers, ranchers, registered and commercial breeders, parents and adult community leaders, and the active participation of good boys and girls. No one of these groups could be eliminated and our feeding program be carried on as extensively as it has been during the past six years.

Farmers and ranchers have been very cooperative in furnishing us good animals at reasonable prices and then giving their moral support throughout the feeding and showing period. Adult leaders are very helpful in assisting boys and girls at home and away at the shows.

Numerous things enter into the picture when a potential champion steer is being fitted. To begin with, one must have a suitable place to house the animal to be fed. This place does not need to be elaborate, but should have a handy arrangement and be located where it may be kept clean at all times. The size would vary according to the number of steers being fitted. A shed 12 feet by 12 feet is ample for one animal and it should be open on the south with windows in the other three sides to be opened or closed according to weather conditions. In front of this shed an outside pen about 20 feet by 50 feet is advisable. This provides some exercise space for the animal,

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and in the early stages of feeding the calf may stay out some in the sun. This entire set up should be chicken-proof.

Under the shed should be placed a feed trough, easily accessible to the animal, a water tub and a hay manger. The pen should be bedded with fresh, clean sand or straw. Personally, I prefer sand as it is always available in West Texas and is very cheap.

Boys and girls planning on feeding steers should have their facilities ready before they start their calf on feed. In fact, I think it wise for them to have everything ready before I select their calf for them.

A very important step in fitting a champion is the selection of the animal. In selecting a calf with championship possibilities the following things should be considered:

1. Breeding of herd from which animal is to be selected. It is good to see the calf's sire and dam and know their bloodlines.

2. The quality of the calf, as shown by loose, pliable hide, and soft, silky hair.

3. Choose type indicated by short, straight legs; short, deep body with smoothness; and straight top and under line.

4. Balance and style are desired; always look at a calf at a distance, to see how well all parts blend together for balance from front to rear. Style is indicated by how the animal carries himself and walks out. He should be alert.

5. Wide spring of ribs with a full deep round are necessary.

6. I like to get calves that have just turned the corner—without too much baby bloom, but that have not gone so far down hill as to "doggie."

The calf should be handled with care in moving him to his new home. He should be handled firmly but without abuse. Show him you are not going to harm him by scratching under his chin or on his back. If the calf weighs under 400 pounds he should be started on a nurse cow. The nurse cow should be a good milker (from three to four gallons a day) and the milk should have a butter fat content of from 3.8 to 4.8. Nurse cows should be fed a balanced dairy ration.

Baby calves should be nursed three times a day at regular hours—6, 12 and 6—and after calves are three to four months old they may be nursed only twice a day.

Calves should be started off on a good, clean, coarse ration. Calves up to 400 pounds may be fed a ration consisting of 5 pounds of cottonseed meal pellets, 10 pounds of bran, 20 pounds of cracked corn and 65 pounds of crimped oats. Along with the ration, calves should

have all the non-legume hay they will eat. Hay should be kept before the calves at all times. The calves should be fed three times a day just what they will clean up. Each should eat from 1½ to 2 pounds of the ration for each 100 pounds of body weight. Keep plenty of clean fresh water before calves at all times.

After the calf is started on nurse cow and ration, begin teaching him to lead with a halter. Lead him outside the pen and shed before each nursing. Start grooming with rice root brush and scotch comb immediately. Grooming is a great aid in the making of a champion. The calf should be groomed at least three times daily.

"Eye of the Master" Fattens Calf

After the calf is taught to lead and to enjoy grooming, he should be well settled. Then is a good time to dehorn, castrate and vaccinate. Calves should be treated for lice and other external parasites at regular intervals throughout the feeding period. Usually this should be done from every 14 to 21 days. They should be watched very closely for any digestive disorder, and should be treated at the first sign. This means that the same person should nurse and feed the calf at all times. Many good drugs are on the market for treating calves for cold, scours and the like, but most of this can be eliminated if the feeder keeps a close check at every feeding on the animal and his droppings.

When the calf passes 400 pounds the touch of the flesh becomes very important. Changing of the ration starts at this point usually, and changes are made according to the touch of the flesh. The touch should be firm, but not hard, with what we call "spring back" to it. The flesh should be smooth over the calf's entire body. Bran helps to keep quality in the touch of the flesh. Oats seem to help keep the flesh smooth and corn tends to put on the flesh. Barley will "firm" the flesh. For the period when the calf weighs between 400 and 650 pounds the ration usually will be about as follows: 30 pounds of cracked corn, 5 pounds of crimped barley, 5 pounds of cottonseed meal pellets. 15 pounds of bran, and 45 pounds of crimped oats. Of course this ration is subject to change according to the touch of flesh.

Exercise Must Be Given Regularly

Throughout the feeding period exercise is very important, but even more so from 600 pounds upward. A calf should be exercised from ¼ to ½ mile, morning and evening. Start at this point in training the calf to show with show halter and

show stick. Considerable practice is required to get an animal properly trained. Boys and girls also need some training along this line.

After the animal weighs 800 pounds, he should be on a finishing ration and should be bathed once every two weeks, with extra hours of grooming with rice root brush and scotch comb. When the calf is bathed be sure to rinse all soap out of the hair. Curl right after washing—and curl with curling comb and comb hair up until dry. Do not leave calves to dry themselves.

The calf's feet need to be watched throughout the feeding period and trimmed as needed, but two to three months before the show special care should be given the feet. Trim with hoof nippers and common wood rasp. Some calves require more feet care than others, but it is necessary to keep the hooves short, straight and smooth.

The finishing ration at this point will usually be about 40 pounds of cracked corn, 5 pounds of cottonseed meal pellets, 20 pounds of bran, 10 pounds of crimped barley and 25 pounds of crimped oats—again subject to change according to touch.

Calves may be weaned any time after reaching 400 pounds, but many times calves do better on a nurse cow until they are about a year old.

Steers show best weighing at from about 900 to 1,050 pounds. Keep in mind some of the shows you are planning to take your animal to, and know their classes. Do not try to carry a steer too long. The flesh becomes dead and the animals lose their bloom. Over-age calves never look too good in the showring.

The last 15 days before going to a show, it is well to tie the steer up and bed down on the same material that will be used at the show—usually straw. This helps the animal to settle down quicker when you arrive at the show. Clip the animal's head and tail before leaving home about 10 days before show day.

Be extremely cautious in hauling your calf to the show so as not to get him too hot or cold, or off his feed. It is best to cut down on the feed before hauling and to come back slowly with feed after getting to the show. Try to arrive at the show at least three days before show day. This gives the calf a chance to fill up and get over any soreness that may have been caused by the ride.

Upon arrival at the show let the animal rest for at least 12 to 24 hours on a clean straw bed. Then give him a good bath and comb completely dry. Exercise the animal twice daily while at the show, and feed and water

three times daily. Have the calf full on show morning, and oil his hair with a light coat of dressing. Rub oil well into the hair, then comb and brush the hair even and smooth. The boy or girl showing the steer should be neatly dressed, and should keep an eye on the judge at all times while keeping the animal standing squarely on all four legs.

It is not the big things that ordinarily make champions but the regular attention to the small things such as cleanliness, grooming, exercise, showing, regular feeding hours, parasite control and knowing the animal. Careful attention to all of these usually means the difference.

Corn Silage Lets Cows 'Rough It'

Scientists may be one step nearer to the cheapest ideal balanced diet for dairy cows, according to tests run at the Michigan Agricultural Experiment Station.

If corn silage is fed properly, cows can now be given an all-roughage ration and still have a diet that is balanced for milk production and health.

A few months ago, dairy nutritionists decided that grain in corn silage provides the "unidentified grain factor—without grain feeding. Now they have proved it—cows can "rough it" all the way.

Eight Holsteins produced considerably more milk on less total nutrients—but lost a little weight from the lack of their eager appetites—when they had corn silage substituted for part of their all-hay pre-test ration.

First the cows were given an all-hay ration. Then after they had their milk-producing ability worn down the milk was tested daily over a 30-day period.

The hay was good quality and contained enough protein. Four different corn silages, harvested in different crop years, were used. Hay and corn silage were measured daily and the cows were weighed every three days. In the depletion period the cows ate 36 pounds of hay. They ate only 15 pounds daily—along with 55 pounds of silage in the test period.

Milk shot up from 18 to 23 pounds a day within the first 15 days after the corn silage was substituted in the ration. It reached a peak in 12 days. The investigators pointed to the need for an allowance for the amount of corn in silage—with 55 pounds in this case equal to 7.5 pounds of corn.

Michigan State College

Newcastle Vaccination Through the Drinking Water

A new way has been discovered to help fight this troublesome poultry disease . . .

Condensed from the American Poultry Journal

Dr. James F. Harr, D.V.M.

VACCINATION for Newcastle disease in chickens by administering the vaccine through the drinking water has been shown to be an effective and convenient method. That conclusion is based on the results of both laboratory and field trials conducted at Dr. Salsbury's Laboratories.

Experimental work by Dr. E. L. Jungherr and Mr. R. E. Luginbuhl at the Univ. of Connecticut preceded these tests. Encouraging results from these Connecticut experiments have been reported.

The findings of Jungherr and Luginbuhl stimulated the commercial work already referred to, where it was further demonstrated that young chicks, vaccinated through the drinking water when 4 days old, develop an immunity that withstands weekly challenge of a virulent strain of Newcastle disease virus from 2 through 11 weeks after vaccination.

Early research work involved in developing water vaccination revealed the need of a stabilizer in the water. The virus in a vaccine when placed in water tends to die off with the passage of time. When dead or inactivated, this virus is generally not capable of producing immunity in birds.

It has been demonstrated, however, that the addition of a stabilizer in the drinking water aids in prolonging the duration of potency of the vaccine after it is placed in water. By adding a stabilizer to the water, it was discovered that the virus will remain active and alive for a suf-

Reprinted by permission from American Poultry Journal, Chicago, Illinois, Sept. 1954

ficient time to permit birds to drink and expose themselves repeatedly to the vaccine. This practice is incorporated in administering the new vaccine.

In these commercial tests, the birds used were hatched from eggs produced by a U. S. Pullorum-Clean flock which had been demonstrated to be nonimmune. This was accomplished by challenging a representative sample of birds in the flock with virulent Newcastle disease virus. All birds challenged died from Newcastle disease.

The chicks were hatched from eggs placed in isolation in the incubator—no other eggs were present. Birds were kept in isolated, separate units from hatching time until the tests were completed.

When the chicks were 24 hours old, blood samples were taken from a representative group of birds and pooled for the Hirst Hemagglutination test for Newcastle disease. The response was negative, confirming that the chicks were not parentally immune to Newcastle disease.

In the laboratory trials, chicks were kept in isolation units entered only by a double-door air lock arrangement. The isolation units used for challenge were completely separated from the isolation units for raising birds.

The critical tests done in the laboratory were carried out in 15 new isolation units in the virology department in which no other chicks had been housed previously. During the course of the tests, no birds or additional equipment or tools were added to the test units. An even temperature and constant air pressure were maintained in each unit.

The anticipated feed that the birds would consume was placed in the units at the beginning of the experiment. Water was supplied through automatic devices. The number of birds in each test was large enough so that a representative number of birds could be taken from each unit for seriological testing and challenge each week.

Before entering, the attendant took a shower and dressed in a freshly laundered, white uniform. Disinfected rubber boots that were knee high served as footwear.

Such precautionary measures are necessary in virus studies to prevent introduction of another virus disease or any other disease of poultry which might influence results of a single experiment.

Field trials were conducted under typical broiler conditions in different local areas.

Cumulative results at the time this material is being released for publication show a mortality of only 4.1% after challenging a large number of birds that had

been vaccinated for Newcastle disease through the drinking water. This compares with a mortality of 98% for a group of nonvaccinated, susceptible birds which served as controls and which received a similar challenge. In other words, 95.9% of the vaccinated birds lived, and 98% of the nonvaccinated birds died.

As a result of these experiments, the practice of vaccinating chicks through the drinking water for protection against virulent strains of Newcastle disease is being developed.

The Salsbury research work has shown also that a greater degree of immunity can be established in the growing chick if a second vaccination is given through the drinking water at 4 weeks after the initial vaccination.

This second vaccination serves to keep the immunity at a high level. In general, immunity builds up a peak soon after the vaccine has been administered and then slowly decreases. It is possible that birds formerly immune to a field strain of Newcastle disease can succumb to a similar exposure later on when the degree of immunity has declined. By keeping immunity high, birds are usually able to withstand challenge of Newcastle disease encountered in the field.

The advantages of effective drinking-water vaccination for Newcastle disease are quite obvious. Less equipment, labor and time are involved in using this method than in any other system of vaccination.

The vaccine used in the experiments was the B^1 strain of the Newcastle disease vaccine, commonly used in manufacturing the intranasal type vaccine. It does not usually cause the morbid changes which ordinarily occur when birds encounter a field strain of Newcastle disease. Rather, the vaccine serves as an antigen that stimulates the bird's natural defense mechanism to resist Newcastle disease exposure.

There is no danger of overconsumption of the vaccine. Humans have little or no contact with the vaccine as it is being administered; therefore, the health hazard is minimized. The virus eventually dies in the drinking water, so that sterilization is automatic.

These experimental tests have shown that when Newcastle disease Strain B^1 vaccine is administered through the drinking water, the vaccine will remain alive and active for 24 hours under normal temperatures, a sufficient time to vaccinate the birds. Upon drinking the water containing this vaccine and stabilizer, birds will develop an immunity to Newcastle disease.

Quick Soil Build-up

New methods bring marked increase in yields . . .

Condensed from The Indiana Farmers Guide

James P. Hoekzema

IN St. Joseph county, Indiana, is a man with an idea. Not only has A. T. Marvel an idea, but for the past 10 years he has been developing and selling this idea.

Marvel believes that fertile soils are the foundation of a prosperous agriculture. He believes that it is possible to have a "quick build-up of soil fertility," and he has a large number of demonstrations to prove his ideas.

The ideas have proved successful in many ways. In 1945 only 23 carloads of wheat were shipped from New Carlisle. Now after a few years of Marvel's ideas, 175 carloads of wheat were shipped in 1953. Much of this increase has been due to the teachings of Tom Marvel, in his night classes and with the G. I.'s he has also instructed.

A. R. Horvath and Sons have used the quick build-up method on their farm west of New Carlisle. Last year these men produced 63 bushels of wheat per acre. They used deep tillage, working the soil to a depth of between 8 and 12 inches. At time of planting, 350 pounds of 4-16-16 fertilizer were applied per acre. One 90-bushel load of manure was applied as a top-dressing during the winter and in early March, 33 pounds of nitrogen were applied per acre. An excellent yield was the result.

Robert G. Taylor produced almost as much. His yield was 61.5 bushels per acre, and on 30 acres he had an average yield of 54 bushels. He also used deeper tillage than he had been in the habit of using, applied 300 pounds of 4-16-16 per acre and top-dressed in early spring with 42 pounds of nitrogen.

Carr Rodgers raised almost as much, too, as his yield was 61 bushels per acre. He applied 1,000 pounds of rock phosphate

Reprinted by permission from The Indiana Farmers Guide, May 15, 1954

per acre back in 1950 and grew red clover on it in 1951 and 1952. He applied 300 pounds 8-8-8 in the spring of '51, and another 1,000 pounds of rock phosphate in the spring of '52. The wheat was started with 400 pounds of 4-16-16, and in the spring, 33 pounds of nitrogen (100 pounds ammonium nitrate) were applied per acre.

* * *

Beef cows differ greatly in being able to produce heavy calves. The weaning weight of a heifer's first calf is a good indicator of her future performance.

* * *

Sixteen farmers in this area had yields of more than 50 bushels per acre, while the list of 40-bushel yields included 46 names. All used large amounts of plant food and are building up their soils quickly.

Eugene M. Meyers, R. R. 6, South Bend, won the corn growing contest. He increased his yield from 59.2 to 134.2 bushels per acre. This land was plowed 10 to 11 inches deep and 600 pounds of 10-10-10 were plowed down. Two hundred pounds of 10-10-10 were applied when the corn was planted. He had a plant population of 16,500, knowing that a large number of plants are needed to obtain the maximum yields from the fertilizer.

Myers had an even more interesting story for he had an acid peat that had a pH of only 3.9. He said, "I planted corn on this field and the corn came through the ground, turned yellow and died. I applied 14 tons of ground limestone per acre and brought the pH up where I could grow crops. I also used an 8-8-8 fertilizer. This field yielded 108.2 bushels per acre, where before I could grow nothing on it, but blueberries."

This is another example of quick soil build-up.

In the 5-acre corn growing contest, **Paul M. Cooreman** won the county trophy (as well as the local one) with a yield of 158.8 bushels. There were 80 5-acre plots in the county, according to E. C. Bird, county agricultural agent, and one of the young men who has been using the rapid method of soil improvement won over all the others in the county.

Marvel awarded a trophy for the best balanced farming program. This was won by **Roy Peterson and Sons,** R. R. 3, South Bend. The Petersons started in 1949 and have developed a well-rounded program for labor, crops, fertilizers, and livestock.

Twelve other farmers who attended the New Carlisle night classes won awards for producing yields of more than 100 bushels of corn in the 5-acre corn growing contest.

Extra Nitrogen Needed to Decay Crop Residues

Farmers should recognize the importance of adding nitrogen when non-legume crops are turned under . . .

Condensed from The Kentucky Farmer

WHEN large amounts of straw or other organic matter are turned under, yields are sometimes lower for the crop that follows. The same thing may happen where a heavy cover of broom sedge is turned under.

This has led farmers in many instances to burn off crop residues instead of turning them under, but that is a serious mistake when we consider how low our soils are in organic matter and humus.

The right answer lies in correcting the conditions which cause the lower yields, by applying nitrogen to the residue which is being turned under—in order to cause it to rot. It will not decay without nitrogen.

Organic matter contains some nitrogen and lots of carbon. When the organic matter becomes soil humus, there should be one part of nitrogen to every 12 parts of carbon for the best crop growth. This is called the nitrogen-carbon ratio.

Organic matter from legumes has a ratio close to one to 12—which is ideal. But corn stalks or straw have so little nitrogen and so much carbon that when turned under the ratio in the soil may jump to as much as one to 60 or 80.

When this happens, bacteria which cause the corn stalks and straw to decay, draw on nitrogen in the soil. These bacteria hold the nitrogen and the amount available for a crop is limited. Eventually the organic matter will decay and the one to 12 nitrogen-carbon ratio will be restored.

But until this happens, crops suffer from lack of nitrogen. Also, because the bacteria are starved for nitrogen, they can-

Reprinted by permission from the Kentucky Farmer, Louisville, Kentucky, May 1954

not do their job quickly and much material is lost.

It is recommended, therefore, when strawy materials are turned under that 15 to 25 pounds of actual nitrogen, equivalent to 50 to 75 pounds of ammonium nitrate, be applied before the next crop is planted.

This will help provide the nitrogen needed to give the desired one to 12 nitrogen-carbon ration and make it possible for bacteria to speedily decompose the organic matter and not bring on a lack of nitrogen to hinder growth of the crop.

In the maintenance of soil fertility and crop production, the nitrogen supply should be kept adequate for organic decomposition in the soil without robbing the growing plants of the nitrogen needed for profitable crop production. This most important principle has been least understood and most neglected by the farmer.

Now, Seed Alfalfa in Corn

Alfalfa planted between wide corn rows may soon offer farmers a simplified rotation program.

Scientists on the experiment farms of the University of Wisconsin have been checking the value of seeding alfalfa and corn the same year. Art Peterson, soils specialist, says the trials are turning out very well.

While the idea of using corn instead of oats as a nurse crop for alfalfa is fairly new in Wisconsin, Peterson says it may be a big help to farmers with erosion problems. This method keeps a cover on the soil except for the few months in the spring when the land is being prepared for seeding corn.

Peterson says seeding alfalfa with corn increases the overall production of a field during the rotation, since 50 bushels of corn is equal in feeding value to 110 bushels of oats. And, seeding the field down directly from the row crop keeps a lot of weeds from going to seed.

Seeding corn in wider rows requires more kernels per foot of row to get the same number of plants per acre as normal row spacing. But this method does leave room to plant the alfalfa. Wide-row corn rows are usually 60 to 80 inches apart.

Alfalfa is seeded between the wide rows when the corn is about 18 inches high, and needs to be fertilized just as it would in normal seeding. This requires more fertilizer on the land the same year—for the corn and for the alfalfa—but gets a stand of alfalfa started during the corn's growing season.

University of Wisconsin

Fence Posts for the Farm

A fence built with the right kind of posts properly treated and set will last three to four times longer than one carelessly built . . .

Condensed from The Rural New Yorker

Ernest C. Grant

A POORLY built fence is a bad investment. Many cows have been injured on fences with broken posts and sagging wires. Heifers have been bred by the wrong bull or at the wrong time because a fence was weak. Time is needlessly wasted because someone has to chase the cows that get out through a broken place in the fence.

Single or double strand electric fences, with their posts far apart, save considerable time and expense where they can be used. But there is still a place for the strong, well built fence around barnyards and permanent pastures, around the areas that are used year after year to keep cattle where they belong.

Fence fixing and building always seems like an extra job. It usually comes in the Spring when other work is crowding and when farmers want to get on the land to sow oats or to plow. Much time and labor can be saved over a period of years in fence-building, however. It can be saved by building good, strong, permanent fences in the first place.

Use Long-Lasting Posts

Probably the biggest saving is to use posts that will last a long time—15 to 20 years. This can be done with many kinds of wood if you use a preservative. The preservative gives you up to three times the usual life of the post.

Wood varieties vary in their lasting ability. Red cedar and black locust have a reputation for outlasting other woods. These posts are good 20 or more years without treating. Heartwood of trees is more durable than sap wood. Posts of white cedar, white oak and honey locust cut from heartwood last 15 to 20 years. None of these need to be treated.

Reprinted by permission from The Rural New Yorker,
333 West 30th St., New York City, July 17, 1954

But every farmer does not have these durable woods. There are many posts of beach, birch, maple, ironwood, black oak and basswood used because these varieties grow right on the farm. Without treatment, these posts have to be replaced in three to five years. But with the use of preservatives, they will postpone fencebuilding 15 or more years. In other words, these woods, when treated, are as good as the more durable woods untreated.

Materials and Methods

There are several materials and several methods that can be used to preserve posts. Some materials are water soluble, some oil soluble. Some may be used on green posts, others on seasoned posts; some can be used on posts that are round, others on split. Treating posts takes time; but the results are worth it.

Suppose you have fresh cut posts with the bark on. The Forestry Department at Cornell University, Ithaca, N.Y., recommends the use of chromated zinc chloride, one pound to one gallon of water. A cloth wick covering is put on one end of the post, which is set upright. A quart can of the chromated zinc chloride solution is inverted on top of the post; gravity then takes the liquid into it. A solution of copper sulphate can be used instead of the zinc chloride. The treatment should be applied as soon as possible after the post is cut; it can be done any time of the year except when the wood is frozen. In the Fall or late Summer is a good time to treat fence posts for use the following Spring.

Pentachlorophenol is an oil-soluble material used on seasoned round or seasoned split posts. This is purchased in a concentrated solution and is diluted with kerosene or fuel oil, or it is used with motor oil that has been strained. The posts are set in a barrel or tank of the solution deep enough to cover the posts well above where the ground line will be, and they are allowed to soak for some 72 hours. Pentachlorophenol is noted for its penetrating ability. Each cubic foot of post should absorb three to six pints of the solution. More must be added to the tank or drum as the posts absorb the liquid. It penetrates best in warm weather but it can be used any time of the year. If you wish to preserve the entire post, it should be entirely immersed. However, most farmers, to save money, treat only the parts that will be below ground line and a few inches above. The ground line is usually where the post rots or breaks.

More recently, preservative compounds have been developed in paste forms. These are easy to apply because they are brushed on with a stiff brush or spatula until about one-

fourth inch thick, covering the area that will be in the ground and a short distance above. The material is then held close to the wood by wrapping a bandage of waterproof paper around the treated part. The paper temporarily separates the treated part from the soil. Some of these pastes are adapted to green wood, some to dry. All are applied to wood after the bark has been removed. The posts are set the same day they are treated with the paper bandages.

Wood preservatives are sold under various trade names and may be obtained at farm supply stores. The cost of treating depends on the material used, the size of the post and whether a part or the entire post is treated. The treating costs, of course, increase the first cost of your fence. But, the cost of upkeep during its life will be reduced in two ways. First, posts will not break so quickly; second, with fewer broken posts there will be fewer broken wires.

Sharpening Fence Posts

Time and labor can be saved in sharpening posts. Most posts are sharpened with an axe; some time can be saved if they are sharpened with a buzz saw. During the past few years, a post sharpener has been developed at the Cornell Forestry Department.

Some fence posts are set, but at present most fence posts are driven into a hole that has been made by hand with a crowbar or post-hole digger. Posts can be driven more easily and quickly if done so from the platform of a wagon or a trailer some two or three feet above the ground. Usually this is the vehicle that draws the posts.

Machinery manufacturers are now making mechanical post-hole diggers to help the farmer with his fencing problems. These post-hole diggers work like a large auger, operated by the power take-off on the tractor. They can be used where the soil is not too heavy. They may change the method of building fences on many farms where soil permits their use. With them, more posts will be set and less will be driven; with them the hole can be made quickly and with little labor. The posts do not have to be sharpened; thus, less labor is used. Packing the dirt around the post to make it firm in the ground, however, probably takes longer than driving the post. Many farmers believe that a set post will last longer than a driven one and that a fence of set posts is stronger. This will vary with the manner in which the work is done and the type of soil.

Although it costs more at the start, the life of the fence can be increased and upkeep decreased if posts are spaced properly. This might be eight feet in a barnyard, and 12 to 16 feet for pasture fences. Posts

spaced too far apart break from the extra weight of the wire used, or from the strain of cattle pushing on the wires. There will be less rebuilding if posts are spaced so the fence is strong. There will also be less rebuilding if four or even five strands of barbed wire are used instead of three. With fences of three strands, cattle can push easily, stretching the wire and loosening the posts.

With attention to high-quality materials and good workmanship, fences may be made to last a long time with a minimum of repair.

Pick Bulls By Heart Beat

Cattlemen may soon be selecting young herd sires with the aid of a stethoscope—the instrument the doctor uses to listen to your heart. Experiments conducted at Oregon State College have shown a relationship between the speed of a young bull's heart and the ability to make quick, economical gains in weight. The faster the heart beat, the better the gaining ability.

New Mexico Extension

Bulk Tank — Ring Test

Increased use of bulk milk tanks for storing and cooling on many farms has raised the question of the reliability of brucellosis ring testing on large volumes of milk, as some tanks hold as much as 300 gallons. The Wisconsin Department of Agriculture set about to find the answer and conducted a survey of farms with bulk milk tanks.

"From the 136 herds tested, the following results were obtained:

(1) There were 63 reactors, reactor-suspects and negative herds as determined by the blood test. On the ring test three of the herds containing reactors gave a negative result. This represents a 95 per cent correlation with the blood test.

(2) There were 73 suspect herds as determined by blood test. Sixty-one of these herds gave negative ring test result. This would seem to indicate there was little or no correlation with the blood test in locating suspect herds among bulk tank producers. This is not considered to be a serious handicap to the efficiency of our testing procedure.

The results as obtained would indicate that the ring test, when applied under these conditions, is adequate in locating brucellosis infected herds.

Livestock Health Bulletin, Wisconsin

Mulch To Hold Moisture In the Orchard

A mulch soaks up rain like a sponge . . .

Condensed from American Fruit Grower

C. P. Harley

THERE are some fruit growing sections that cannot profitably enjoy the benefits of irrigation. The tremendous amount of water required to irrigate land and insufficient water sources preclude irrigation of a relatively large proportion of fruit plantings.

When this is the circumstance, a good mulch can be a partial substitute for irrigation under most conditions; in fact, except for irrigation, mulching is the best known method of maintaining adequate soil moisture under situations of moisture stress.

In areas that depend on rainfall for the soil moisture supply, a heavy mulch of hay, straw, corn fodder, or other plant residues, provides an effective means of trapping rain water. With a well-established mulch there is little or no run-off even though the downpour may attain "gully washing" proportions.

Aside from mechanical retention of water and a natural affinity of decomposing organic matter for moisture, a mulch conditions the soil so that better water penetration and aeriation take place. It has been found that the infiltration rates of water into certain clay soils under mulch are over five times greater than the rates without mulch.

Thus, all the water that falls is retained under adequate mulch, and this may be sufficient to supply the tree during periods of moderate drought. Under conditions of severe and prolonged drought it was found that the reduction in fruit growth rate of apples started later on mulched trees than on unmulched ones, and the fruit was larger at harvesttime.

Reprinted by permission from American Fruit Grower, Willoughby, Ohio

In addition to the prevention of soil compaction, mulching also contributes to soil-moisture conservation by slowing down surface evaporation and by discouraging the growth of grass and weeds. In general, mulching, because of its many favorable influences on tree growth and production, is a management practice that should receive serious consideration by fruit growers who are unable to irrigate but who are in a position to obtain the necessary materials for mulching.

Milk Production Costs Change

Feed cost for producing 100 ponds of milk has changed a great deal in the last several years reports C. W. Nibler, Nebraska extension dairyman.

In 1940, according to the annual reports of the dairy herd improvement associations, the feed cost per hundred pounds of milk was 68 cents. This was the average on 2,800 cows that produced 9,367 pounds of milk and 358 pounds of butterfat. In 1950 the feed cost for producing 100 pounds of milk was $1.54. This was the average of 4,100 cows which produced 9,101 pounds of milk and 349 pounds butterfat. Last year the feed cost was $1.84 per hundred pounds for 5,957 cows that produced 9,325 pounds of milk and 354 pounds butterfat.

In addition to increased feed costs, other factors affecting production have also increased. With increased costs, how can the dairymen receive a fair return for his labor and investment? The most important factor is the production per cow.

Cows that produced 11,900 pounds milk last year had a feed cost per 100 pounds of $1.49; while cows that produced 5,810 pounds had a feed cost of $2.40 per hundred pounds of milk.

Another important factor effecting production costs is the quantity and quality of feeds provided the dairy herd. The most profitable herds last year consumed between 3 to 4 tons high-quality alfalfa hay, slightly over 2 tons good-quality silage, and 3,320 pounds of grain. In addition, the cows had five months of pasture. Grain was fed at the rate of 1 pound for each 3.6 pounds milk produced. Practically all dairy feeds can be produced at home. The amount of feed which one needs to buy will depend to a large extent upon the quality of his roughage and pasture.

Another very important factor that will influence the cost of producing milk is the length of the cow's dry period. Production of milk in one large herd was reduced 30 pounds daily for every cow dry more than 60 days. *Nebraska Extension*

HOW TO STRETCH YOUR FEED DOLLARS

Milo proves an excellent feed for turkeys and may be used as a substitute for corn. . .

Condensed from Turkey World

Prof. L. F. Payne, Kansas State College

CORN is still king among cereal grains, but its position as a turkey feed, in some areas, is being challenged by certain grain sorghums, especially milo. New varieties, high yield per acre, low cost of harvesting, and more economical gains make the difference.

Analysis showed that while 100 pounds of number two corn and milo each contain 80.1 pounds of total digestible nutrients, corn has only 6.6 pounds of digestible protein, compared with 8.8 pounds for milo, or 25 percent less. Yellow corn possesses carotene from which vitamin A is produced in the digestive organs of the turkey. Plant breeders say it will be only four or five more years before carotene is available in some of the grain sorghums.

Since the presence of carotene is apparently the only important difference between yellow corn and grain sorghums, this vitamin can be purchased in a stabilized liquid or powder form and added to any ration to meet the vitamin A requirement of 4,000 international units per pound of feed. This will cost about one dollar per ton, and will still leave milo costing less than corn in areas where it is grown.

Since grain sorghums are not as palatable as corn, poults should be started on the grain early in life. W. A. Sanford, Phillips County (N.W.), Kansas, recently wrote the author: "We start feeding a small amount of milo the third week and keep it before the poults until they are ready to market. We feel this is a distinct advantage over corn, allowing us to start sooner and poults eat it readily. We feel we get as good weight as from corn and get a much nicer, white carcass.

"We have been able to buy milo at quite a saving under

Reprinted by permission from Turkey World, Mt. Morris, Illinois, May 1954

corn. We now have about two-thirds of our milo for this year's feeding in our bins at two dollars per 100. Corn was costing about $2.78 per 100 at the same time."

While processing milo into crumbles, flakes, or pellets usually increases its palatability, as indicated by tests at Kansas State College, it is doubted that the extra cost is justified. Turkeymen feeding milo seem to depend upon the birds being started on the grain early (three to five weeks old).

Extensive experiments over a number of years at the Garden City (S.W.), Kansas Branch Experiment Station showed milo and kafir gave superior gains to corn and other cereal grains at less cost per pound of gain. Local milo, kafir, barley, and wheat and shipped-in corn and oats at local retail prices, were fed to lots of (200 each) Broad Breasted Bronze turkeys to 28 weeks of age.

Milo and kafir as the principal grain in two of the lots (62 percent of each), when adequately supplemented with protein, vitamins and minerals, produced gains on less feed per pound and at lower costs than other grains with which they were compared and which were properly supplemented. For example, the lot fed kafir consumed 3.70 pounds of feed per pound gain; the milo group, 3.72 pounds; corn, 3.78 pounds; wheat, 4.14 pounds; barley, 4.22 pounds; and oats, 4.42 pounds.

Comparing cost per pound of gain, the different grains gave the following results: Kafir, 14.53 cents; milo, 14.78 cents; barley, 16.15 cents; corn, 16.26 cents; wheat, 16.88 cents; and oats, 18.02 cents. Using the milo group as standard or 100 percent (milo being much more extensively grown than kafir or other grain sorghums), kafir ranked 101.7 percent; barley, 91.5 percent; corn, 90.7 percent; wheat, 87.5 percent; and oats, 82 percent. Freight on long shipments for corn and oats made them cost slightly more than they would where locally grown.

The total feed consumed per bird (males and females) to 28 weeks of age was 70.4 pounds of grain and mash for the kafir lot, 73.8 for corn; 74.5 for milo; 82.9 wheat; 84.4 barley; and 90.3 for oats. The average live weight (both sexes) was 20.4 pounds for the lot fed oats; 20.0 pounds for milo, wheat, and barley lots; 19.5 pounds for corn; and 19 pounds for the group fed kafir.

It was demonstrated in the Garden City tests that the cost of production could be further reduced to 11.1 cents per pound gain by finishing the turkeys on milo and grass or green alfalfa hay and water after 20 weeks of age. This is earlier than some turkey growers may

wish to discontinue mash or pellets. If so, it is suggested that the concentrated feeds could be eliminated after 23 or 24 weeks of age with a mash or pellets. If so, it is suggested that the concentrated feeds could be eliminated after 23 or 24 weeks of age with a considerable saving in the cost of feed, and without lowering the quality of the market turkeys.

When two ground grains were mixed to constitute the bulk of the ration for each lot, milo and wheat rated as 100 percent; corn and wheat rated 90.5 percent; oats and wheat, 89.2 percent.

Three grains combined, using milo, barley, and wheat as 100 percent, made milo, wheat, and oats 93.8 percent; corn, wheat, and oats, 92.6 percent. In all of these tests, milo produced gains eight to 18 percent cheaper than barley, corn, wheat, or oats.

Oats was most expensive due to its bulkiness, the amount consumed and high cost. The turkeys on the oat diet ate 15.8 pounds more per bird than those on the milo diet to 28 weeks of age. The turkeys from all lots were dressed and graded according to United States Department of Agriculture standards with relatively little difference among the groups.

The three popular varieties of milo, Westland, Martin, and Midland, have been developed on dwarf stalks to be harvested with combines. This also makes them adaptable for harvesting with turkeys. Three acres of a light yield of milo, at the Garden City Station were "gobbled down" by 122 turkeys in seven days. They ate the heads, leaves, and most of the stalks. The farm superintendent said it would have cost four dollars per acre to harvest the grain with a combine, and the turkeys derived some good from the leaves and stalks.

Carl Stout of Richland, Missouri, has harvested milo with turkeys. According to Stout's report, turkeys hatched in mid-May and pointed for the Thanksgiving market can be turned into the milo in the middle of September, when they are about four months of age. He allows one acre of milo for 200 birds. A good crop running 2,000 to 4,000 pounds per acre should reduce other feed costs about 50 cents per bird, according to Stout. That is a worthwhile saving for any grower.

Kansas State College Tests have shown grain sorghums do best in 20-inch rows. They require little or no post-seeding cultivation, and can thus be handled entirely with equipment used for wheat.

William Lake, Marshall County, Kansas, has let the turkeys harvest his corn for the past several years. He begins when

the corn is in the roasting ear stage. One round trip with a double disc lowers the stalks to the ground, and cuts both stalks and ears into pieces so they are readily available for the turkeys. Grain, green leaves, and most of the stalks are consumed. **He has experienced no trouble with the birds overeating green corn.** One probable explanation is that the turkeys are on full feed all the time so they do not overeat. Another is that he limits the area of cornstalks broken down according to the number and age of the turkeys. This system is continued until late in the fall when the corn is ripe and all is harvested by the birds.

* * *

A single cutting of alfalfa requires 326,000 gallons of water per acre to grow it; an acre of cotton needs 800,000 gallons to mature a crop.

* * *

Plant breeders in Nebraska, Oklahoma, and Texas are endeavoring to transfer the yellow endosperm characteristic into several commercial varieties of milo. Seed for this work was found by Dr. O. J. Webster, University of Nebraska, in Nigeria, Central Africa in 1951.

The carotene content of short Kaura, the African variety, compares favorably with that of yellow corn. Under more humid conditions, as found in Texas, Oklahoma, eastern Kansas, and Nebraska, the new sorghum will not weather and discolor as badly as the commercial varieties which are now being grown. Yellow seeded sorghum may also have more eye appeal, according to Dr. Webster.

One feeding test with 48 percent Kaura in the diet, using growing chicks at the University of Nebraska, showed that Kaura compared favorably with yellow corn and other grain sorghums. Kaura coming from near the equator, will not mature in our short season; hence it is being crossed onto adaptable varieties.

With a support price on corn and no support on sorghums, and since corn is not grown in much of the sorghum producing areas, the latter can be fed to turkeys where available when it costs less than corn. In short, it would be just as unwise to feed milo in Iowa, Illinois, Indiana, and Ohio as it is to feed corn in the western sections of Kansas, Oklahoma, Texas, and adjoining states where milo is extensively grown.

Since the common cereals discussed above compare favorably in feeding value, with equal quality, the turkey grower can feed the one available at lowest cost. When properly supplemented with protein, vitamins, and minerals, he should obtain good growth at minimum cost.

Now, Squirt on 10-10-10

Latest news on liquid fertilizer—complete-analysis solutions. . .

A SUCCESSFUL FARMING REPORT

COMPLETE high-analysis liquid fertilizers such as 10-10-10 are no longer a prediction. They're real to farmers in central Jndiana and Illinois.

Many farmers in these states had liquid fertilizers custom-applied in the spring of 1954. Others put them on with their own rigs.

You may not be able to get complete high-analysis liquids for a while, but they're coming fast.

- The new liquids are made in small plants by mixing ammonium hydroxide and phosphoric acid, both liquids. Then, urea crystals and dry muriate of potash or potassium chloride are added to the liquids. The result is a stable solution. Coloring is added to identify the various analyses.

- Many different analysis are possible. One Indiana manufacturer is making everything from 3-10-10 to 20-5-5.

- Prices are about the same as those of dry fertilizers. In both Illinois and Indiana, liquid 10-10-10 is spread for the same price as dry bulk 10-10-10.

- Since the liquids are made in small plants, custom applicators can give quick service to their locality. Each plant services a relatively small territory.

- Liquid fertilizers can be transferred from storage to the applicator tank by the tractor power take-off pump. The job of buying, storing, and wrestling with fertilizer bags is eliminated.

- Liquid fertilizer can be carried on the tractor, in tanks mounted up, out of the way, or on machinery. You can put down complete liquids when you plow, disc, or plant. The size of the nozzle opening and speed of the tractor determines how much liquid you're getting on. Farmers say they're easy to apply in accurate amounts.

- Equipment needed is about the same as that required for nonpressure nitrogen solutions. Plastic-lined or aluminum tanks and stainless-steel fittings and nozzles are needed to resist corrosion.

BEEF CATTLE

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Production Testing Beef Cattle April 1954
Self-Service for Steers—May 1954
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Once Over, Ready to Plant—Nov. 1954
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What about Dairying? Greatest opportunity for profits lies in increased output per cow. Artificial breeding and frozen semen will speed-up breed improvement. Egg transplantation to get many calves from your best cows may be a reality. Improved drying of grass will increase feeding efficiency. An economical and less wasteful method of processing and delivering whole milk to consumers surely will be developed and practiced.

Meat Production: Earlier maturing livestock will lower costs, get faster turnover. Young stock probably will be fed better when growth potential is highest. More progeny testing for beef will bring advantages of DHIA to beef herds. If egg transplantation comes, beef calves can come from less efficient dairy cows and resemble them not at all.

Sheep, Hogs: Experiments with hormone injections are producing two crops of lambs a year, but for the long run a better way probably will be to increase fertility by breeding and selection. Fat lambs offer quick turnover in capital and use of facilities.

In swine, more pigs per sow will come. Weaning at 3 or 4 days and brooding on special creep feeds can produce three litters in little over a year.

Progress in crops and cropping practices are sure to continue. The importance of grass in pasture and meadow will be emphasized. Soil Conservation and soil conserving practices will be recognized and practiced on every farm. For the long run, the outlook for agriculture is bright indeed.